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The Apple II Journal

September 1984
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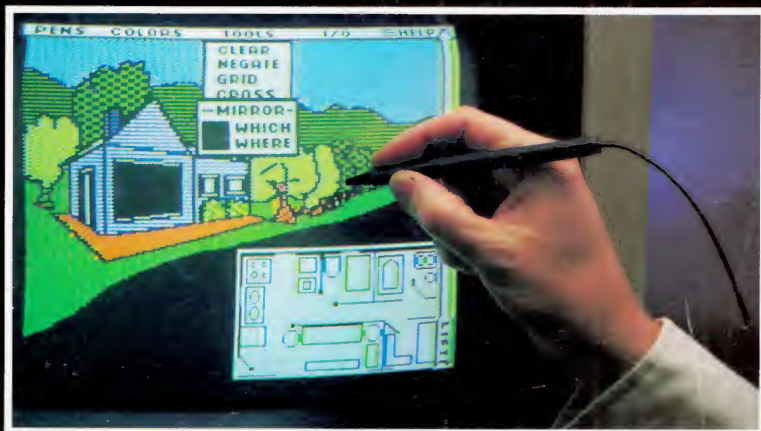
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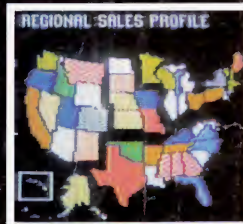
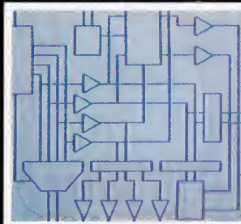
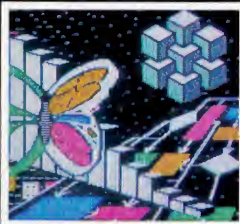
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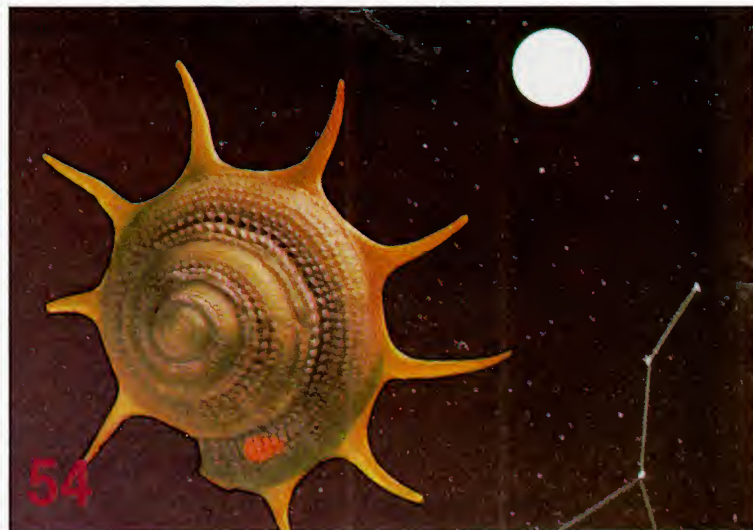
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FERMENTATIONS



Moving Ahead with Computer Education

Computers are transforming the little red school house. Today's teacher uses the computer as teachers ten years ago used blackboards or filmstrips. In some kindergartens, computers are as common as finger paints. At all levels, these super tools spark student interest and enthusiasm.

"The next generation of kids will be intellectual giants if we use computers as they should be [used]," said Ludwig Braun of the New York Institute of Technology at the 1984 National Educational Computing Conference.

As Education Editor for *inCider*, I have attended educational conferences, talked with teachers and administrators, and read numerous educational magazines this past year. Here are some of my findings on the state of computing in education:

● **The market for both software and hardware is burgeoning in the schools.**

The number of computers in the schools doubled last year. Nearly 100 percent (97.8 percent) of school districts have installed one or more

microcomputers, according to an April 1984 study by Quality Education Data (QED), a Denver-based research firm specializing in computers in education. Apple still holds its lead, with over 50 percent of schools using Apple computers. Portable computers will appear in the schools, perhaps to be checked out like books by libraries.

According to *Microcomputer Hardware and Software in the El-Hi Market, 1983-1987*, schools spent \$488 million on computer software and hardware in 1983 and forecast \$1.23 billion by 1987.

School systems are buying computer hardware and software as consortiums to obtain better prices. New York, for example, saves money by using state-wide contracts and large volume purchases of computers and software.

The quality of software has improved, according to experts like Dr. Gary Bitter of Arizona State University, whose forthcoming book is entitled *The Best of Educational Software for the Apple* (Sybex).

Traditional educational publishing companies like Scott Foresman, Scholastic, Macmillan, Houghton

Mifflin, and so on, are entering the market with educational software for grades K-12. The availability of good software at reasonable prices encourages schools to spend more money on software. Better authoring systems also give teachers without programming skills the option to prepare their own programs or tests, as Linda Pattison's article on SuperPILOT, "Between Student and Teacher," demonstrates.

Schools are paying more attention to educational software used in the home. Parents are approaching teachers for recommendations of programs to use at home with their children. This month, our Learning Machine columnist, educator Fred Huntington, suggests how parents and teachers can cooperate in choosing software to supplement the remedial student's schoolwork. Computer compatibility and connections made between home and school en-

Since our focus this month is on computers in the schools, I've turned "Fermentations" over to our Education Editor, Joan Witham.

—P.Q.

by Joan Witham

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FERMENTATIONS

vironments are trends to watch for in the future.

•How can schools afford to get enough computers for their students?

The impetus to get more computers into the schools is coming from both parents and administrators. Money is still a problem; administrators worry about what school programs will be short-changed in order to buy computers.

Donations from computer companies (including Apple and IBM) have helped to meet the need in some cases. California schools (K-12) benefited from Apple's "Kids Can't Wait" program this past year. Apple shipped over 9000 Apple IIe systems during the spring and summer of 1983 as part of this program whose offshoots include the extra-curricular computer clubs Cindy Carr reports on in "Apples After School."

"Teachers Can't Wait," the Apple Educational Foundation's new program, directed by Dr. Barbara Bowen, has two thrusts in 1984: curriculum development and teacher-training. Sixteen grants were awarded to joint efforts by colleges and K-12 schools to set up classroom-based models of excellence using the microcomputer in the learning process.

Schools can now get major price breaks from Apple on purchasing computer equipment, peripherals, and software.

•Equity is a national problem that will take a long-term solution.

Poor school districts cannot afford as many computers as their more privileged counterparts can. The wealthier schools are five times more likely to have computers than are less fortunate schools. While poorer schools use their computers for CAI (usually drill and practice), well-to-do schools teach students how to control (program) computers.

According to Carol Edwards of the Southern Coalition for Educational

Equity, there are some creative solutions to the equity problem. Wealthy schools have been paired with poorer schools and rural schools have been paired with urban, so both can receive the same extras. For Columbus, Ohio's successful, community-based solution to the problem of computer equity, see our photo-feature entitled "Populist Computing."

Fewer girls than boys use computers. Attracting more girls into computer classes will help offset the gender gap in computing.

•What should the schools do with the computers? Should they teach computer literacy, do CAI (Computer Aided Instruction) in the classrooms, or teach computer programming?

"Over one third of the states have set standards for computer literacy."

While everyone is climbing on the computer literacy bandwagon, the term itself means different things to different people. "Computer literacy" denotes programming skills to some, learning what a computer can do to others. Debate on the subject, though somewhat abated this year, continues, as our article "On the Road to Computer Literacy" demonstrates.

Colleges are formalizing their computer science programs in a search for a set of requirements for computer literacy expected of all students.

Over one-third of the states have set standards for computer literacy, requiring at least a one-semester course on computers. The California Department of Education has finished its first draft of a model course of study in computer education for

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In *Donkey Kong Jr.*² by Nintendo³ Junior tries to rescue his father against immense odds. And speaking of Donkey Kong, there's also *Mario Brothers*² by Nintendo³. This time, Mario and his brother Luigi battle creatures on four levels of floors, encountering all sorts of treacherous enemies.

In *Track And Field*¹ you can compete by yourself or

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And still playing to the delight of audiences everywhere are *Pac-Man*⁴, *Ms. Pac-Man*⁴, *Jungle Hunt*⁵, *Battlezone*™, *Donkey Kong*², by Nintendo³, *Centipede*™ and *Pole Position*⁶.

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FERMENTATIONS

grades K-12, which cites specific skills and knowledge students should master in computer operation, applications, computer science, and the social impact of computers.

A noticeable trend now is in the teaching of computer applications. Word processing especially is taking off, for example, in creative writing, technical writing, and research applications. Easy-to-use software programs like Bank Street Writer, Kid-Writer, and Story Writer have spurred the way here. Spreadsheets are being used in math, business, and accounting courses—especially in the colleges. Data processing for research and information gathering is a coming educational trend.

• This was a growth year for both Logo and Pascal.

The growth of Logo this past year has been phenomenal. Logo is available for almost all the micros. Apple now offers a new, updated Apple Logo II (reviewed in this issue). Classes in Logo, Logo magazines, user's groups, and even a Logo Hot Line (The Midnight Turtle) are available for the Logo lover.

The computer science section of the Advanced Placement (AP) exam now requires knowledge of Pascal, which should show more of a profile by next year. As a first programming language, BASIC is falling behind both Logo and Pascal.

• Evaluation of the plethora of educational software on the marketplace—over 3000 programs for the Apple alone—is a big problem.

Teachers want an easy way to preview software packages before their schools buy them. To fill this need, many new directories and magazines are reviewing and rating educational software.

The following are examples of such sources: The SECTOR project, Utah State University, provides reviews of software for special education students. The National Educational Association (NEA), a powerful force with teachers, evaluates, cer-

tifies, and prints in a catalog software that it deems educationally sound. The 1984 Educational Software Preview Guide from the California Department of Education lists 600 K-12 software programs that are worth previewing. In an attempt to influence software before it comes on the market, the Center for Learning Technologies (CLT), sponsored by the New York State Education Department, will evaluate and send a written report within seven days on any potential educational software it receives from software companies.

• The most critical issue in computing today is teacher training.

More teachers are becoming involved now that the computer is no longer within the province of the computing teacher and the math department exclusively. Reluctant classroom teachers need training to help them integrate the computer into their classes. The position of Computer Coordinator, unheard of four years ago, is now held by 11,000 educators, either part-time or full-time. Their job is to help schools and classroom teachers become computer-literate.

Colleges are rushing to meet the needs of these coordinators and classroom teachers with courses on computer languages, applications, and computer literacy. Accreditation of these college courses, as well as certification of these teachers, is being argued over in both large and small colleges.

• Resources to help the schools—from educational magazines, consulting groups, publishing groups, computer groups—are all growing to meet the demand.

Networking through computers to share software is becoming more commonplace. Bringing schools information from on-line databases will be a trend in the future.

Computing is thriving in the schools. Though still in its infancy, computer-based education can help prepare students for an information-based society. ■

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LETTERS

Sexy Ads Revisited

Just a few lines in appreciation of James Haskin's rebuttal of the sundry sanctimonious reactions to "offended sensibilities" from the Bible Belt and other "incorruptible" bastions of Morality, Mom, The Flag, Apple Pie, and What's Right and Proper.

It would seem that anyone with the mentality to operate a computer would have the discernment and integrity to rise above these stupid arguments concerning women as exclusively sex objects, whether used to advertise bulldozers or dil-does, and concentrate on the manufacturer's message.

The ivory tower residents who affect indignation at the mere mention that sex is implicit in everything (how do they think we got here in the first place?) have so arbitrarily pre-empted a "special" niche in the natural order of things that they can't even recognize their kinship with the other animals. And in the matter of separating people from ideas, they're continually preoccupied with who invented the wheel. They simply refuse to accept or understand that a man whose personal life is an on-going class lesson for the Devil could have ten minutes of insight priceless to us all.

The truly righteous will probably never honestly address the essential ego problem inherent in all of us, choosing instead to compensate for the warp in their psyches by crusading and unmasking Evil (especially in the December 1983 issue of *inCider*) and stamping it out. I'm in total agreement with Mr. Haskin that they should check their own drives for a slipped disk.

Maybe I'm just a cretin and have no business in anything as esoteric, aesthetic, and super-scientific as poking and peeking at a computer, but I can't deny that nine months before I was born my parents probably did something "naughty."

Too bad I can't claim the distinction of having been spawned in a glass pipette!

Donald A. Ruch
415 North Ontario Street
Burbank, CA 91505

All Sorts of Good Things

Thank you for "The Sort Index" (May 1984)! I'm taking a class with a group of other teachers who are attempting to keep up with the almost overwhelming task of learning about sorts. The text we are using explains the methods you are using, but your "Fully Implemented Sort Index" program is beautiful! What a neat idea to use this program as an index to random access records! This will help me in my own programming attempts to gather data on my students in my microcomputer classes. I've been battling with the problem of using a bundle of DIM statements for each student in my class and then attempting to shove all of this information into a temporary string to be sorted. This solves my problem.

I would like to make a suggestion which might help all of us who are learning and all of the pro-hackers who are writing for *inCider*. Use REM statements throughout your programs with a bit of explanation about what you are doing. It's difficult to look back to the written explanations when a REM would do the trick. An example REM might be to explain that your printer does not print a 0 and uses an O instead.

You hit the nail on the head with this sort program. You just gave me a gold mine of a programming idea for the price of less than \$2 for a subscription copy. What more can I say, except thanks!

Bob Blaske
8867 S.E. Colony Street
Hobe Sound, FL 33455

Reader Disservice Cards

I believe the idea of reader service cards is great. I have been filling them out and sending them in for several years.

I'm going to stop after this month's card. While the idea is great, the practice leaves a lot to be desired. All too often, all I get is a reprint of the ad which sparked the notation on the reader service card, plus another sheet or two of ad copy that tells me little if anything more than I already knew about the product. For six months afterward, I get a blizzard of other mailings that have nothing to do with the product I asked about.

If the company has nothing more to say about the product, why does it go through the trouble of soliciting the requests? Is it looking for a mailing list for other products? Is this just a way to determine the reach of the ad?

Scott W. Peters
11229 Korman Drive
Potomac, MD 20854

We're sorry that you've been disappointed with our advertisers. We get very few complaints about reader service cards; most letters tell us of the good results they get. Don't give up on the cards—your luck will change. —eds.

Copy Controversy

The controversy over software piracy seems to have died down recently, judging by the letters and articles in microcomputer publications. However, from my own experience I feel that it is as much a problem as ever and is merely reaching the level of general acceptance. Lest it arrive at that point and doom us forever to the curse of sophisticated and costly protection schemes, I submit the following:

An open letter to software pirates: I am constantly amazed at a

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BASF

LETTERS

practice so prevalent among micro-computer owners that a person who does not participate in it is almost considered a freak. I refer to software piracy. I prefer to call it by its correct name—software *theft*. I am not referring only to those who copy software for profit or underground distribution, but to anyone who copies copyrighted software which they did not purchase. The law is clear on this point. You have the legal right to copy software which you have purchased for your own use. Any other copying, even if you give, not sell, the copies to friends, school, users' groups, or anyone else, is *illegal*. In spite of this, I know people who would not think of violating the 55 mph speed limit but freely and frequently copy copyrighted software for others or to give to others.

I have heard and read more rationalizations for this practice than I could possibly list. They are just that, merely rationalizations of those who must make excuses for their actions. One of the most common I hear is "software is overpriced." To that I say, if you absolutely cannot live without a piece of software then, whatever its price, it is worth it to you to pay the price. Otherwise, I suggest that you do not buy it, do not copy it—in short, do not use it. If it is truly overpriced and people do not buy it or use it, the price will come down or it will disappear. Rather, we should encourage and support such software publishers as A.P.P.L.E., Penguin, Beagle Bros, and others who have chosen to reduce their costs and their prices by not copy protecting their software. These publishers sell top quality software for reasonable prices. I encourage you to buy and use their products, but please do not rip them off by stealing their software.

For those of you whose only ethical standard is "It's OK if I don't get caught," I don't expect to make

much of an impression on you. You are right about one thing—if you don't sell bootlegged software you probably won't get caught. Rather, I am writing this to those of you who hold to some form of ethics or morality which says it is wrong to steal, whether or not you might get caught. Consider what you are doing when you accept or give copies of copyrighted software; the example you are setting for your children and friends. What you are doing is stealing, regardless of your rationalizations to the contrary.

Just because software piracy does not receive the attention in the press that it once did does not mean that it is no longer a problem. In reality, it is bigger than ever as more and more people purchase computers. I don't expect that this letter will make much of a difference in the overall problem, but if it causes only a few who may be unwittingly copying software to accept the reality of what they are doing and refuse to continue the practice, then it is worth it.

**William G. Wright
4591 Jamboree Street
Oceanside, CA 92056**

Copy protection has had more than its share of discussion in the last few years. There are strong views from both sides of the fence, and I will not attempt to side with either. Nonetheless, one point is unarguable: When a manufacturer chooses to copy-protect his software, he takes upon himself a weighty responsibility.

By removing the ability to backup software, a legitimate purchaser is forced to use the original copy of a program for everyday operation. This is against the most basic rules of computer common sense. If this program is an important piece of business software, the problem is greater still. Damage to the disk could spell disaster. Obviously,

manufacturers have concerns of their own and are justified in protecting their interests. But there are reasonable ways to accomplish this goal.

Beagle Bros is perhaps the most liberal software company around. Not only are their disks protection-free, they will replace a damaged original and provide updates for only \$5. Their attitude is that people are basically honest. As they say in their catalog: "Thanks for not giving copies of our disks away. You support us and we'll support you."

Other software companies have found ways to guard against unauthorized duplication without causing the user undue grief. For example, Software Publishing Company, makers of the pfs: series, includes a spare program copy in every package. If a problem should arise with the original, the user has something to use until a replacement arrives—a sensible solution to a delicate problem.

If a manufacturer adopts a copy-protection scheme, he should also be willing to do the following:

1) Take Software Publishing's example and include a back-up.

2) Replace damaged disks for *no more* than the cost of the disk itself (maximum \$5), regardless of the type of damage, and do so for as long as he remains in business.

Charging \$25, \$35, and occasionally \$50 for a replacement copy of protected software, as is the practice of some manufacturers, is inexcusable. There is no reason why a legitimately purchased piece of software cannot be replaced free of charge if it becomes unusable.

I would urge everyone to look carefully at warranty and replacement policy information before making any substantial software investments.

**W. Charles Doherty
32 Meadowood Drive
South Dartmouth, MA 02748**

What made over 100,000 Apple II owners fall in love with System Saver?

It's the most versatile, most convenient, most useful peripheral ever made for the Apple.*

System Saver* filters out damaging AC line noise and power surges.

70-90% of all microcomputer malfunctions can be traced to power line problems*. Problems your System Saver guards against.

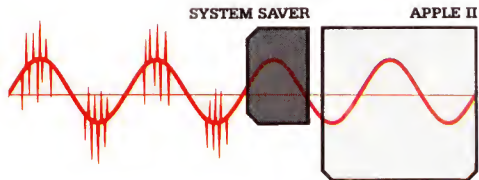
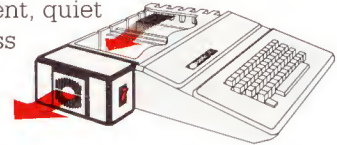
Power line noise can often be interpreted as data. This confuses your computer and produces system errors. Power surges and spikes can cause severe damage to your Apple's delicate circuitry and lead to costly servicing.

System Saver clips surges and spikes at a 130 Volts RMS/175 Volts dc level. A PI type filter attenuates common and transverse mode noise by a minimum of 30 dB from 600 kHz to 20 MHz with a maximum attenuation of 50 dB. You end up with an Apple that's more accurate, more efficient and more reliable.

System Saver lets your Apple keep its cool.

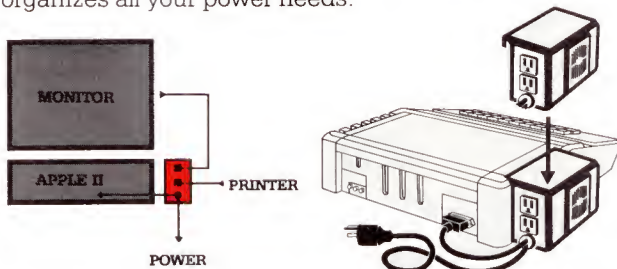
Today's advanced peripheral cards generate heat. In addition, the cards block any natural air flow through the Apple IIe creating high temperature conditions that shorten the life of the Apple and peripheral cards.

System Saver's efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots. It leaves your Apple cool, calm and running at top speed.



System Saver makes your Apple more convenient to use.

No more reaching around to the back of your Apple to turn it on. No more fumbling for outlets and cords to plug in your monitor and printer. System Saver organizes all your power needs.



It functions as a multi-outlet power strip with two switched outlets. Plus System Saver offers the ultimate convenience; a front mounted power switch for fingertip control of your entire system.

So if you want to keep damaging heat, line noise and power surges out of your system for good, pick up the only peripheral that's in use every second your computer is in use. The System Saver. You'll soon come to think of it as the piece Apple forgot.

Compatible with Apple stand



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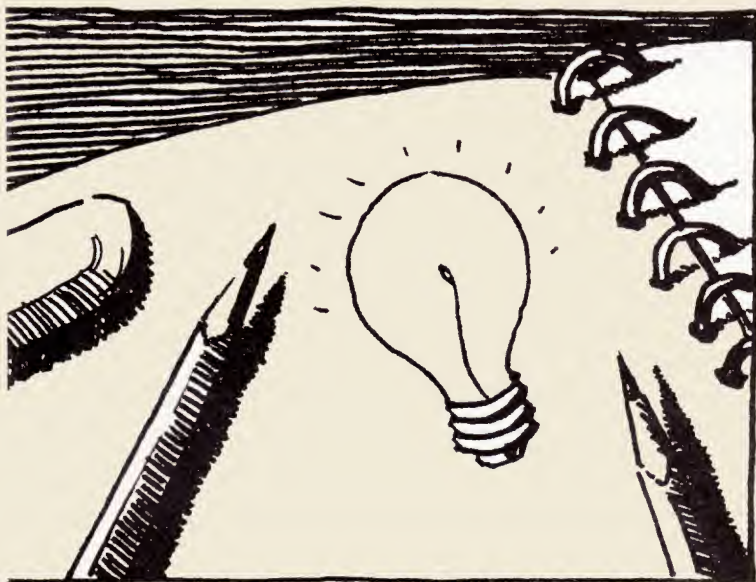
251 Park Avenue South, New York, NY 10010
(212) 475-5200 Telex: 467383 KML NY

*PC Magazine: March 1983.

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Available in 220/240 Volts, 50/60 Hz.

Circle 86 on Reader Service card.

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Scholarly Pursuits

If the cost of higher education gets any higher, students literally won't be blamed for walking with their heads in the clouds. That's when scholarships come in handy.

Software City, a micro-computer software chain, is offering a \$10,000 scholarship award for a computer program writ-

ten by a high school student. The winner's program will be sold in Software City stores. On top of the scholarship prize, the winner's pot is sweetened by 25 percent of the revenues. Four runners-up will receive \$1000 scholarships.

If you've got a whiz kid in the family, the entry deadline is December 31, 1984. For details, write to the Scholarship Director, Software City, 1415 Queen Anne Road, Teaneck, NJ 07666.

Software Pickings

The next time you check out the bestsellers on the Book of the Month Club's list, don't be surprised to find a software pick of the month.

Editor Susan Weinberg said the club began offering selected programs to its estimated one million members in 1983, but started at a low key, non-aggressive pace.

The company recently announced the addition of Homeword and The Dark Crystal, two Sierra On-

Line programs, to its selections.

Homeword is an easy, affordable home word processing program. The Dark Crystal, an adventure game based on the movie produced by Jim Henson of Muppets fame, promises to entertain gamers.

Other popular titles include Pinball Construction Set, The Witness, and Dinosaur Dig.

"We focus our software offerings on the more solid entertainment and home productivity packages, rather than the more trendy products," Weinberg said.



Illustrations by Katherine Mahoney

Gotcha Covered

When you send your child off to college, you want to protect your pride and joy, don't you? After all, that computer was some graduation gift. Safeware, an insurance company specializing in computer coverage, offers college students direct computer protection.

"Safeware is ideal for the college student," said David K. Johnston, chief executive officer of Safeware, The Insurance Agency, Inc. "First of all, it is low cost coverage. For less than \$100 you can cover \$5000 of equipment. Also, because it is so simple, coverage can be issued immediately. It's handled directly with the student, not the school."

After investing so much money into a computer system, it seems only natural to safeguard your property as you would a new car or home. Manufacturer guarantees don't cover every calamity, and repair costs can be prohibitive on a student's budget.

"Safeware offers unique coverage. It is based on the total value of the system. Annual premi-

ums cover all hardware, media, and software up to an amount stated by the owner when the policy is issued. Individual pieces are not itemized, so no coverage limits are placed on specific items prior to the claim," Johnston said.

Check on policy coverage with Safeware, P.O. Box 02211, 2929 North High Street, Columbus, OH 43202.

edited by Cynthia Carr

Call Me

Care to add a new bulletin board to your call list? The Plane Apple Club in Wichita, Kansas, operates a free bulletin board system for club members and anyone else who might like to call in.

X Marks the Spot

KITT, the computerized car with a mind of its own from NBC's *Knight Rider*, isn't the only one with access to maps on a computer screen. Under the direction of Donald Cooke, Geographic Data Technology encodes the streets in the United States into a mainframe computer.

Started in 1980, the company works with a Summagraphics D-series digitizer and street maps from the U.S. Census Bureau. For each city block, 300 bits of geographic data are recorded including street names, address ranges, latitude and longitude, and zip code boundaries.

GDT sells sections of its data base to companies

On-line 24 hours a day, the system features computer assisted gaming, technical help, fast response to password requests, and a club store.

Give them a ring at (316) 685-8202, or contact Ralph Wasmer, 2430 North Arkansas, Wichita, KS 67204.

such as Keebler Cookie to help route its trucks, and The Minneapolis *Star-Tribune* to determine readership studies.

"Imagine how many drivers are out there commuting, vacationing, hauling Twinkies," Cooke said. "At least 4 percent of them at any given time are lost or are not taking an efficient route. It is sobering to think how much money and energy can be saved if the country knew where it was going."

Other uses of GDT's computer mapping cover sales territory analysis, market penetration, and land use studies. And you don't have to worry about folding the map back to fit the glove compartment, either.

Write to GDT c/o R.R.#1, Box 397, Lebanon, NH 03766, for details on computer mapping.

Computer Hero

During the Consumer Electronics Show in Chicago, Steve Wozniak, co-founder of Apple Computer, Inc., received the 1984 Gusdorf "Computer Hero" Award. The award is presented to individuals who have made a significant contribution to society by use or application of computer technology.

Wozniak is the first recipient of the award sponsored by the Gusdorf Corporation, a national manufacturer of computer, video, and audio equipment furniture. Based in St. Louis, Missouri, Gusdorf established the award to recognize individual achievement in the computer industry. Nominations were submitted by computer user groups and organizations across the nation.

"Quite simply, Steve Wozniak created and built single-handedly the first personal computer. By doing so, he sparked what has become a 20th century phenomenon," said Paul Gusdorf, chairman of the board. "As creator of the Apple com-

puter, this man brought to the people a useful, inexpensive personal computer. Technical engineers and experts still are amazed by the design of the circuitry, its elegance, and simplicity."



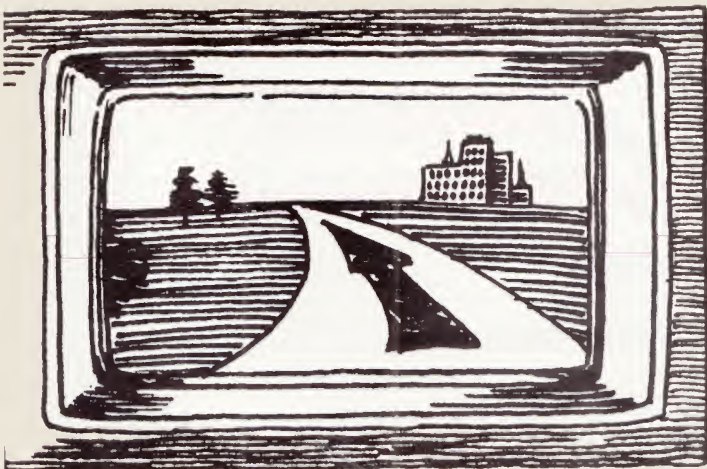
The award consisted of a commemorative plaque and \$2000 cash prize, which Wozniak donated toward the development of the Children's Museum of San Jose.

Got the inside stuff on a story just aching to be told? If you think it might interest Apple users, send the information to The Cider Press, inCider, 80 Pine Street, Peterborough, NH 03458.

Consumer Alert!

We ran an alert in the "Letters" column of our May issue regarding Omni Soft Corporation, 9960 Owens Mouth Avenue, Suite 32, Chatsworth, CA 91311. A number of our readers had been having trouble getting the firm to either send the ordered product or refund their check. For your continued information, we have been informed that mail sent to Omni Soft is being forwarded to Apollo Software, P.O. Box 5372, Wichita Falls, TX 76307.

—the editors



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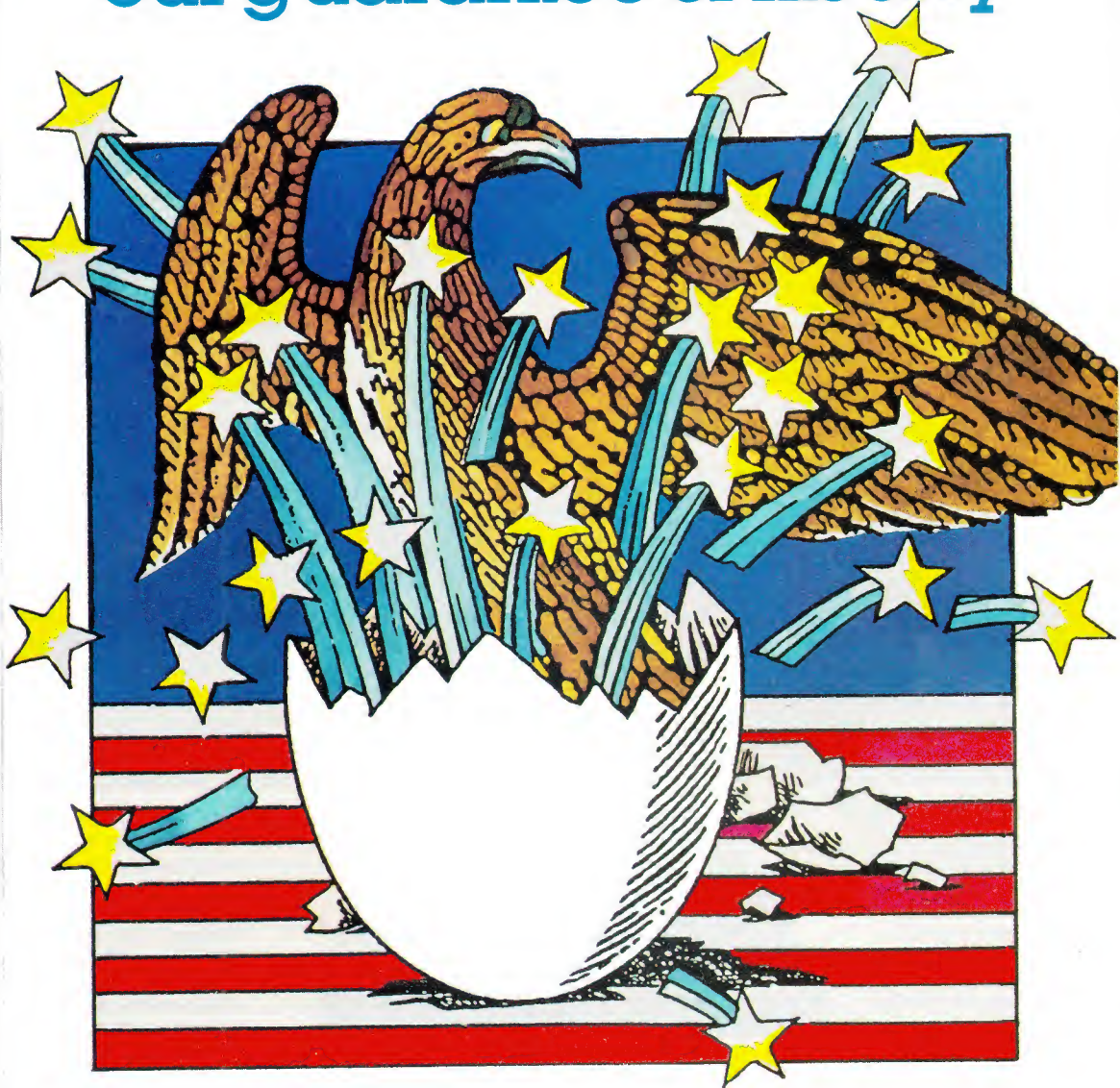
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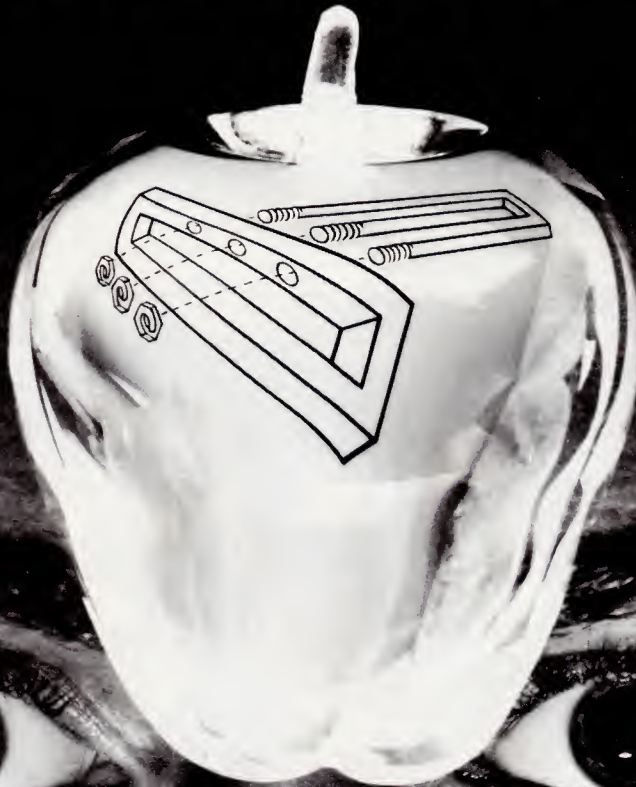


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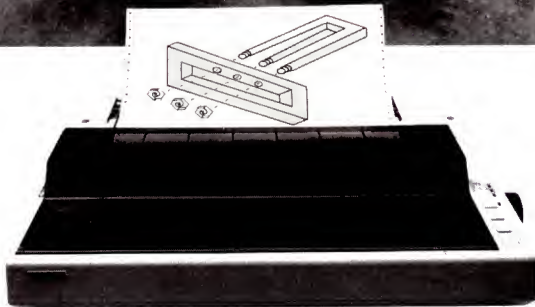
The Grappler + can now be used with the Epson RX and FX series printers, including a unique command to access any of these printers' special graphic modes. In addition, the IDS/Dataproducts Grappler + is available with color capability, including color graphics screen dumps.

NEW! ORANGE INTERFACE FOR TEXT

If your applications don't use graphics, or if you use a letter quality printer, then the Orange Interface is for you. This inexpensive intelligent interface features all the text functions of the Grappler +.

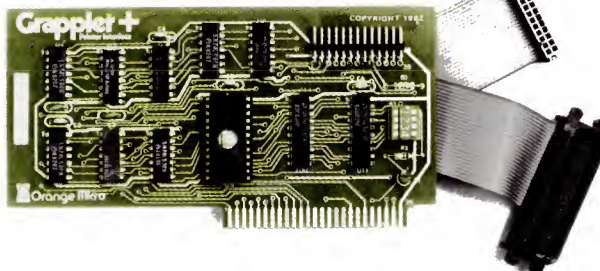
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Home Remedies

Studies show that children who use computers at school score higher on standardized tests than those who do not. It stands to reason, then, that using computers at home should also help children improve their schoolwork.

The secret behind such achievement is in using the computer at home appropriately. The first step to helping your child is to learn about his/her academic profile. Talk to your child's teacher about your child's strengths and weaknesses.

Then ask to see your child's cum (cumulative) file. (The school is required by law to show it to you.) In most states, the cum file contains standardized test scores comparing your child's test results with those of the rest of the children in the country. You may see scores under the title of ARITH (arithmetic) with such categories as APPL or COMP, meaning math applications and computation, respectively. I'll explain these terms later.



If your child is below grade-level on any test, you will need to develop that area at home.

This month's column is devoted to children who need remedial help, while next month's will be devoted entirely to using the computer at home for enrichment activities.

You can address correspondence to Fred Huntington at P.O. Box 787, Corcoran, CA 93212.

Educational programs for your home Apple provide good supplements to the remedial student's schoolwork.

by Fred Huntington

Table 1. These Apple programs focus on specific skills students need to develop through supplemental learning at home. (See **Table 2** for manufacturers' addresses.)

Program	Manufacturer	Grade Level	Price
Writing			
Sentence Combining	Milliken Publishing	4-9	\$ 95.00
Story Maker	Spinnaker Software	K-3	39.95
Writing Competency Program	Educational Activities (EAI)	Junior/Senior High	65.00
Spelling			
Spelling Strategy	Behavioral Engineering	2-up	35.00
The Spelling Builder	Program Design (PDI)	Junior High and up	26.50
Scrambled Letters	EAI	All	33.50
Customized "Flash" Spelling	Random House	—	34.50
Spell-N-Time	School & Home Courseware	All	24.95
Spelling Package	Teaching Tools: Microcomputer Services	—	99.95
Magic Spells	Apple	All	45.00
Compu-Spell	Edu-Ware	4-up	39.95
Spelling and Reading Primer	Edu-Ware	K-4	39.95
Spelling Bee Games	Edu-Ware	Preschool-4	39.95
Scramble	Ahead Designs	1-8	15.95
Mechanics			
Punctuation I—End Punctuation	EAI	4-6 Remedial	49.00
Punctuation II—The Comma	EAI	4-6 Remedial	49.00
Punctuation Skills: Commas	Milton Bradley	5-9	49.95
Punctuation Skills: End Marks, Semicolon, and Colon	Milton Bradley	5-9	49.95
Capitalization	Hartley Courseware	3-8	49.95
Vocabulary			
SAT Word Attack Skills	Edu-Ware	Secondary	49.00
Homonyms in Context	Random House	4-6	60.00
Horribly Homonyms	George Earl	4-up	29.95
Vocabulary Baseball	J & S Software	10-12	29.50
Word Families	Hartley Courseware	1-3	39.95
Vocabulary Skills: Prefixes, Suffixes, and Root Words	Milton Bradley	4-6	49.95
Memory Builder	PDI	1-up	23.95
Language Practice	School & Home Courseware	3-14	24.95
Cross Clues: The Unique Word Challenge Game	SRA	6-up	35.00
Word Attack!	Davidson	4-12	49.95
Word Division	Ahead Designs	1-4	19.95
Cryptocube	DesignWare	3-up	39.95
Story Builder/Word Master	PDI	3-adult	23.95

Analyzing Test Scores

The specific test I'll be referring to is the Comprehensive Test of Basic Skills (CTBS) whose format is similar to that of other standardized tests. If the school doesn't have test scores for your child, ask the teacher about your child's performance in the individual categories mentioned here.

On your child's recorded test scores, you'll probably see SS (scaled score) a number of times. It's a useful number for schools that allows comparison of scores but has little if any home use. GP stands for Grade Placement: a GP score of 5.2 equates to work of fifth grade, second month. PC stands for percentile: a PC score of 51 means the child scores higher than 51 percent of the students in the country taking the same test at the same grade level.

Remember, these scores are relative. An eighth grader's math score of 11.4 doesn't mean he/she can skip all math until the eleventh grade, nor that he/she can function at that level. It's simply a comparison that tells you that your child is relatively good in math.

How to Use the Computer

To help your child do better in school, it is not enough to buy him/her a program, show the child how to turn on the computer, and say "Go to it." You must sit down with the student, go through the directions together, and supervise at least for a while. Soon your child may work alone and won't need or want your help.

Involve your child in the selection of the program from the beginning. Set aside a time each day, or every other day, to work on the computer. Depending upon the child's age, even 20 minutes a day can work wonders.

Now, let's take a look at how individual needs should affect your choice of software. **Table 1** lists commercial software aimed at diverse grade levels and focusing on basic language and math skills.

Writing

If the teacher tells you that your child is weak in language expression (EXPR on many standardized tests)

then your child should work on language usage and sentence structure—the use of various parts of speech, formation and organization of sentences and paragraphs, writing for clarity, and the appropriate use of various writing styles.

Often, when the mechanics of writing turn a child off, the computer can be a real boon. Purchase a simple word processing program such as Broderbund's Bank Street Writer. After your child learns word processing, have him/her write fan letters, thank-you letters, letters to the newspaper, monster stories, stories about favorite movies or television programs—even software reviews.

It matters less what a child writes than that he/she does lots of writing. Assure your child that he/she can make mistakes on a first draft without penalty. Encourage him/her to write for the sake of writing, attending to mistakes later on. Don't even stop to correct spelling errors but just let the words flow. Most students react favorably to this approach because they have been concerned with product rather than with process. You can help with corrections on a later draft.

Not only will a child's fluency increase with frequent writing practice but also you'll note improvement in his/her spelling, mechanics, and even reading skills.

Spelling

On the standardized test results, SPEL, short for spelling, tests applications of spelling rules for consonants, vowels, and various structural forms. Items are presented in a sentence with a missing word. The child then chooses the correctly spelled word from a list of three words.

I have personal reservations about teaching spelling as a separate subject on the computer. Spelling, to me, is best taught by assigning lots of reading and writing. For those of you, however, who remain unconvinced, the table lists some available spelling programs.

Reading

The computer can help improve some aspects of your child's reading. But remember, the best way to be-

Reading Comprehension

Literal Comprehension Program: Reading With Understanding	EAI	2-4	54.95
Critical Reading Program: Reading With Critical Understanding	EAI	2-4	54.95
Big Door Deal	Data Command	4-6; remedial	113.75
Speed Reader II	Davidson	8-up	69.95
Descriptive Reading	EAI	3-8	295.00
Alpine Skier	Data Command	4-6; remedial	113.75
Reading Comprehension: What's Different	PDI	3-up	23.95
Compu-Read	Edu-Ware	Elementary-adult	29.95
Comprehension Power Program	Milliken Publishing	1-12	150.00 (per level)

Computational Mathematics

The Big Math Attack	T.H.E.S.I.S.	1-6	25.00
Bumble Plot	Learning Co.	3-8	39.95
Division Skills	Milton Bradley	6-8	49.95
The Arithmetic Classroom	Sterling Swift	4-12	49.95 (per pkg.)
Addition and Subtraction 1 & 2	Scott, Foresman	1-2	39.95 (each)
Number Series	PDI	6-12	23.95
Elementary Vol. 1.	MECC	Elementary	30.00
Compu-Math: Arithmetic	Edu-Ware	Elementary	49.95
Decimal Estimation	School & Home Courseware	4-up	24.95
Academic Skill Builders in Math: Alien Addition, Minus Mission, Meteor Multiplication, Demolition Division, Alligator Mix, Dragon Mix	DLM	Elementary	39.00 (each)
The Math Machine	SouthWest EdPsych Services	K-6	79.95
Arith-Magic	QED	3-8	35.00
Basic Math Facts and Games	BertaMax	3-6	34.50
Prescriptive Math Drill	Hartley Courseware	1-4	79.95
Mixed Numbers	Milton Bradley	6-8	49.95
Multiply	Reston	4-14	24.95
Math Strategy	Behavioral Engineering	2-up	34.95
Decimal Skills	Milton Bradley	6-up	49.95
Challenge Math	Sunburst Communications	2-6	49.00

Math Concepts and Applications

Semcalc	Sunburst Communications	6-12	95.00
Read and Solve Math Problems #1 and #2	EAI	Remedial secondary	98.00
Survival Math: Simulations	Sunburst Communications	6-adult	50.00
Geometry and Measurement—Drill and Practice	Apple	Junior High and up	50.00
Golf Classics/Compubar	Milliken Publishing	4-up	39.95
Teasers by Tobbs: Puzzles and Problem Solving	Sunburst Communications	4-up	49.00

Table 2. Manufacturers' addresses.

Ahead Designs 699 N. Vulcan #88 Encinitas, CA 92024 (619) 436-4071	Milliken Publishing 1100 Research Boulevard St. Louis, MO 63132 (314) 991-4220
Apple Computer 20525 Mariani Avenue Cupertino, CA 95014 (408) 973-2042	Milton Bradley Educational Software 443 Shaker Road East Longmeadow, MA 01028 (413) 525-6411
Behavioral Engineering 230 Mt. Hermon Road Scotts Valley, CA 95066 (408) 438-5649	Program Design (PDI) 95 East Putnam Avenue Greenwich, CT 06830 (203) 661-8799/792-8382
BertaMax, Inc. 3647 Stone Way North Seattle, WA 98103 (206) 547-4056	Quality Educational Designs (QED) P.O. Box 12486 Portland, OR 97212 (503) 287-8137
DLM One DLM Park Allen, TX 75002 (214) 248-6300	Random House School Division 400 Hahn Road Westminster, MD 21157 (800) 241-9489
Data Command P.O. Box 548 Kankakee, IL 60901 (815) 933-7735	Reston Software 11480 Sunset Hills Road Reston, VA 22090 (800) 336-0338
Davidson and Associates 6069 Groveoak Place Rancho Palos Verde, CA 90274 (213) 378-7826	SRA P.O. Box 5380 Chicago, IL 60680-5380 (800) 621-0476
DesignWare 185 Berry Street San Francisco, CA 94107 (415) 962-9555	School and Home Courseware, Inc. Dept. 930 1341 Bulldog Lane Fresno, CA 93710
George Earl 1302 South General MacMullen San Antonio, TX 78237 (512) 434-3681	Scott, Foresman and Company 1900 East Lake Avenue Glenview, IL 60025 (312) 729-3000
Edu-Ware Services, Inc. 22222 Sherman Way, Suite 102 Canoga Park, CA 91301 (213) 346-6783	SouthWest Ed Psych Services P.O. Box 1870 Phoenix, AZ 85001 (602) 253-6528
Educational Activities (EAI) 1937 Grand Avenue Baldwin, NY 11510 (516) 223-4666	Spinnaker Software 1 Kendall Square Cambridge, MA 02139 (617) 494-1200
Hartley Courseware P.O. Box 431 Dimondale, MI 48821 (616) 942-8987	Sterling Swift Publishing 7901 South IH-35 Austin, TX 78744 (512) 282-6840
J & S Software 140 Reid Avenue Port Washington, NY 11050 (516) 944-9304	Sunburst Communications 39 Washington Avenue Pleasantville, NY 10570 (800) 431-1934
The Learning Co. 4370 Alpine Road Portola Valley, CA 94025 (415) 328-5410	T.H.E.S.I.S. P.O. Box 147 Garden City, MI 48135 (313) 595-4722
MECC 3490 Lexington Avenue North St. Paul, MN 55112 (612) 481-3500	Teaching Tools: Microcomputer Services Box 50065 Palo Alto, CA 94303 (415) 964-4488

come a better reader is to read, read, and read. Nothing improves reading like more reading. The computer itself may motivate your child to read computer books and magazines. Some games, although not intended as reading exercises, require a great deal of reading. Further, games in the Zork series, for example, can lead your child to read the series of paperbacks paralleling the computer versions. It's my philosophy, after seventeen years in education, that it doesn't really matter what students read so long as they are reading.

Vocabulary is an important area of reading skills wherein a computer can help your child. You'll probably see it listed as VOC on standardized tests results. Vocabulary is tested by having the student choose correct definitions from a list of four words. It also tests finding the meaning of words by context.

Reading comprehension (COMP on test results) tests a child's ability to read a passage and to then summarize what he/she has read, draw inferences, and predict outcomes.

'Rithmetic

In the math section of the test, COMPU usually stands for computation and simply measures a child's ability to add, subtract, divide, and multiply. As a student advances through school, the standardized tests become harder, measuring such things as integers, fractions, algebraic expressions, decimals, exponents, and percents.

Another section, mathematics concepts and applications, measures skills such as geometry, measurement, numeration, number sentences, number theory, and problem-solving.

That's Not All!

My software lists are by no means comprehensive and may not include some of the newer programs. All of the programs listed have been reviewed at least twice in computing or educational magazines.

With some proper preparation and consistent follow-up, you can help your child improve when you coordinate your work with that of the school.

Software Pick of the Month

Magic Castle, Fantasy Land, and Galaxy Search comprise a trio of new reading improvement learning games from Learning Well. Each game is available in two levels: red for a reading level of grade 2.0 to 3.5, and blue for reading level 3.5 to 5.0.

Learning Well (200 South Service Road, Roslyn Heights, NY 11577; [516] 621-1540) has been around awhile and has continued to turn out good educational software. An excellent addition to the company's offerings, this trio includes improved packaging, educationally sound programs, and highly motivational software.

Magic Castle

Magic Castle is a fun vocabulary skills game for one to six players. The object is to climb the 10 levels of the castle and be the first to reach the top of the enchanted castle and retrieve the magic wand.

You advance to each higher level by answering a question correctly. An incorrect answer keeps you at the same level and gives you a raspberry sound. An example of a question is "What does glad mean? A. sad B. happy C. angry."

The player can choose from three doors on each level. Two of the choices contain questions and the third reveals Merlin the magician. Merlin will either zap you automatically to the next level, force you to stay where you are, or allow you to move up two levels in one turn by answering two questions.

Fantasy Land

Fantasy Land is an intriguing game that helps children learn to read between the lines. From one to six players guide their ship on an adventure through a mythical land in quest of the fabled sword of justice. Each time you reach another body of land, you read a short passage and then respond to questions that help develop inference skills.

Galaxy Search

Galaxy Search is probably the slickest of the three. It contains good graphics and animation and is educationally sound. You start by navigating your saucer to a planet, being

careful to duck the fast-moving meteors and to conserve your fuel.

Once you land on a planet you walk to your destination where most of the time you are given a passage to read and then a question to answer. The correctness of your answer depends upon your ability to predict outcomes.

One of the things I loved about this game is that when there is a wrong answer, there are no embarrassing raspberry sounds as in the other two games. Finally someone has realized that a wrong answer does not deserve attention.

Each time you get a correct answer you are awarded a robot part. If you get all three robot parts, you navigate back to earth and receive a gala reception.

High Grades

All three games cost \$49.95 each, which may seem a little steep until you realize that they all contain utilities that help you change the parameters of the game (ship speed, time delays, number of moves per turn, and so on). A secret password provides some nifty record-keeping capabilities. You can keep track of how your child does each time the game is played.

I tested all three games on an accelerated fourth grade class and on a slow-to-medium fifth grade class. Both groups were enthusiastic over all three games. The games were so much fun, I caught myself playing with them far beyond the time I needed to review them.

There are no authorizing capabilities on any of the games yet, but there is a utility in the works for Magic Castle. The Learning Well people decided not to come out with authorizing capabilities to add your own vocabulary words until they had the system worked out so well that it would be easy to operate. Hats off to them for that decision.

I recommend these three games for home use and feel that all three are educationally sound and highly motivating to students.

Don't forget to send your questions to me (P.O. Box 787, Corcoran, CA 93212) and I'll try to answer as many as possible.

Thanks for reading. ■

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Hey Diddle Diddle.....	29.95	21.16
In Search of.....	39.95	28.06
Kids on Keys.....	39.95	28.06
Kidwriter.....	34.95	24.36
Kindercomp.....	29.95	21.16
Rhymes & Riddles.....	29.95	21.16
Snooper Troops #1.....	44.95	31.76
Snooper Troops #2.....	44.95	31.76
Story Machine.....	34.95	24.36
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Crossword Magic 2.0.....	49.95	35.96
Dinosaur Dig.....	49.95	35.96
Ess. Data Dup (EDD).....	79.95	58.16
Flight Simulator II.....	49.95	38.96
Gibson Light Pen.....	249.95	196.96
Hayes Mach III Joystick (II + or IIe).....	54.95	39.66
Homeword.....	69.95	50.76
Koala Pad.....	125.95	90.46
Math Blaster.....	49.95	35.96
Mockingboard-C.....	199.95	163.75
Phi Beta Filer.....	49.95	35.96
Pole Position.....	34.95	28.76
Print Shop.....	49.95	35.96
New Step by Step.....	99.95	71.96
SAT (Barron's).....	89.95	65.56
SAT (CBS).....	150.00	108.96
SAT (Krell).....	299.95	249.96
Speed Reader II.....	69.95	50.76
Spell it!.....	49.95	35.96
Story Maker.....	34.95	24.86
Time is Money.....	99.95	71.96
Wildcard 2.....	139.95	110.19

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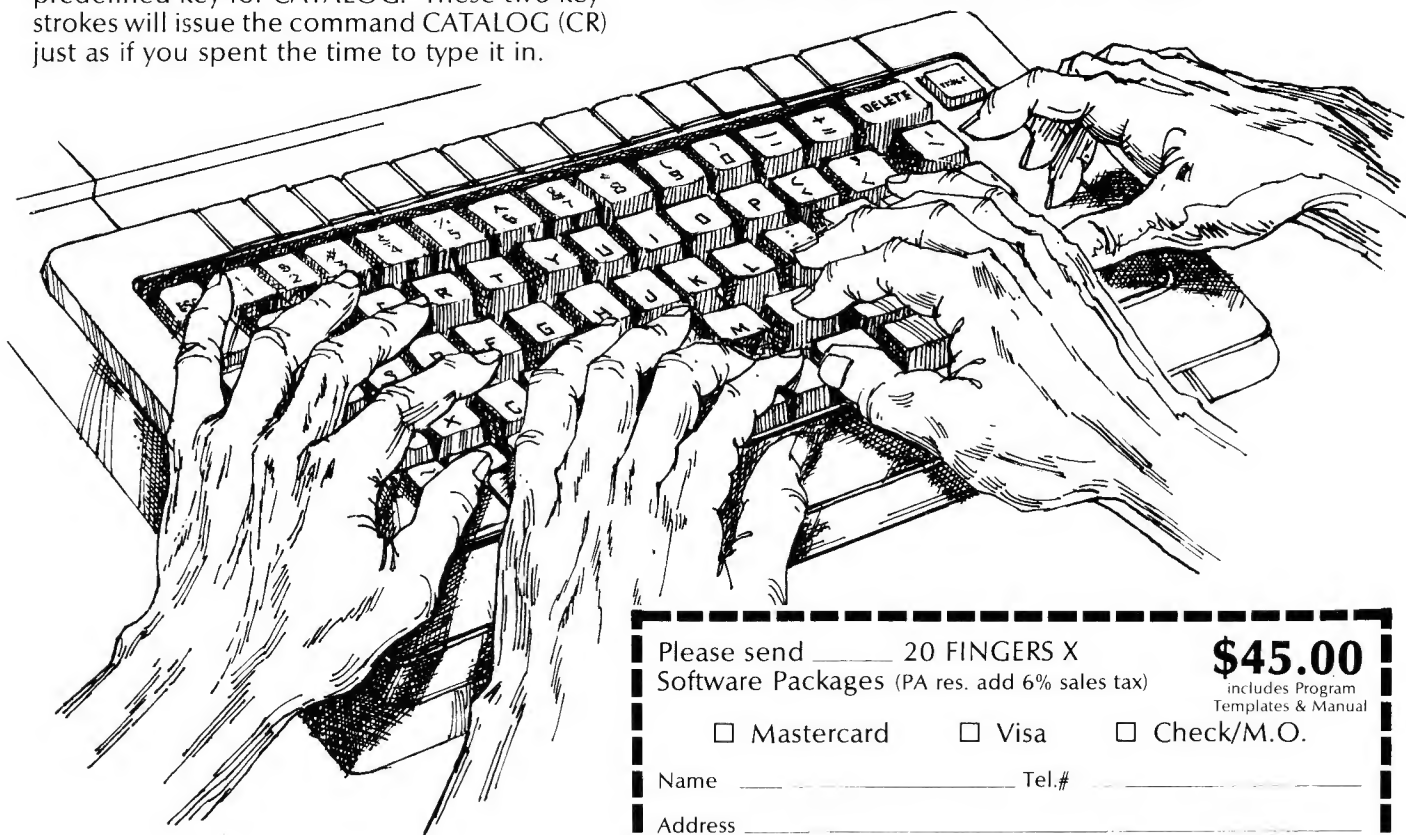
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Screening Monitors

Having settled last month on Apple as the company of choice when contemplating a computer purchase, there remain other decisions to be made, such as which Apple and which peripherals. I promised to address some of these issues this month, from the point-of-view of the writer.

Most of us will want an Apple //e or //c. The ///, the Macintosh, and the Lisa are all rather expensive. Also, Apple has discontinued development on the ///, Macintosh's word processor, MacWrite, is not up to snuff yet, and Lisa has generally been neglected because of its dearth of users.

So, assuming you have or will have a //e or //c, let's consider what kind of monitor should accompany it. After all, next to the computer itself, the monitor is the most important piece of equipment in a word processing system.

Monitors and Televisions

Three types of display devices are used for the Apple II system. First there is the television. Since you can find one in most homes, it's an available option, and one that doesn't add to the initial cost of the system. It



can, under a limited set of circumstances, accommodate the Apple's non-color and color output, and has the advantage of also letting you watch television when you're done.

There are monochrome monitors. They display output on a black background, and the actual letters or graphics are shown in either white, green, or amber (depending on which type you choose). They use a composite video signal, where the horizontal, vertical, luminescence, and synch parameters are delivered to the monitor as one video signal. (These factors determine stability,

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by Bill O'Brien

"If you are going to use your Apple for text work, as you would be doing if you wanted to use it as a writing tool, a television set would definitely not be a possibility."

position, and brightness of the signal.)

Finally, there are color monitors, and they come in two types. There are the composite varieties, which operate on the same principle as composite monochrome displays, only these need a signal with color information. And there is the RGB (red-green-blue) type. RGB monitors deal with the color information on separate lines, as the name indicates. Some RGB monitors want to see the synchronization signal included with one of the colors (usually green), while others accept it as a separate signal.

Employing the Possibilities

The Apple //c comes with an rf modulator. This device attaches to the rear video expansion connector and translates the video output into a signal which a television can display on either channel 3 or 4 (at your option). A similar device can be purchased for the Apple //e for a few dollars.

Both machines have built-in RCA-type connectors for composite color or monochrome-compatible output. They are easily accessible from the rear panel. The signal leaving that point contains color information, but works equally as well on either type of composite monitor.

RGB is a bit more difficult to come by on the Apple. Neither machine has the inherent ability to use this type of display device. On the //e, a separate interface card must be used (in slot 7) to translate its video into RGB format. For the //c, an adapter must be added onto the video expansion port to perform the same function.

As you can see, both machines are equivalent in their display capabilities,

and both have similar potential for extension. There are, however, some very important distinctions in the use of any of these three types of display. Each has strong and weak points.

The Visible Evidence

Two factors enhance or inhibit a video display device: bandwidth and resolution. Together they determine whether your display will look crisp and sharp or smeared and fuzzy, perhaps even unreadable. The higher the bandwidth and resolution of a display device, the better the image.

Lowest in both of these factors is the color television set. It has difficulty displaying a 40-character-wide screen and is impossible for 80-character output. Its forte is graphics. Even then, very fine images may not appear correctly.

One step higher are composite monitors in the \$300 price range. Their resolution is higher than that of a color television, but the bandwidth is usually similar. Forty-column displays appear correctly, as do graphics and graphic images. Unfortunately, because of the bandwidth, 80-column output, which packs more information per horizontal line, is usually quite difficult to read.

RGB monitors present a problem. There are low-resolution and high-resolution versions with prices to match. On the lower resolution models, although 40-column output and graphics will look excellent, you may not be satisfied with the quality of the 80-column display. The only problem here is that high-resolution RGB monitors can cost as much as \$2000.

Most RGB manufacturers will also provide an interface board for slot 7

of the Apple //e. The //c, on the other hand, will take a bit of reworking before you can attach one. Only one manufacturer, that I am aware of, currently offers an RGB interface for the Apple //c.

Monochrome monitors have come a long way in the last three years. At one point, they were simple black-and-white televisions without the tuner and receiver sections. As you might imagine, the bandwidth of some of those devices left much to be desired for anything other than 40-column work. Currently, most monochrome monitors can accommodate a range of bandwidth between 15 MHz and 18 MHz (megahertz), suitable for both 40- and 80-column applications. Of course, they have no color capability, but for applications such as word processing, that shouldn't be an issue.

The Best of Both Worlds

Obviously, the ideal setup for most applications would be a combination of monochrome and color displays. This situation is not as unreasonable as it sounds. At least the Apple computer has provisions for either type of output.

For the Apple //e, this will mean an RCA Y connector, a cable with one male plug for the video output connector on the rear panel and two female plugs, one for each monitor. Alternately, an rf modulator will allow you to use a television as the color display. And, if the modulator has an additional RCA jack for composite output, you can even use a composite color monitor.

For the Apple //c things are a bit easier. Apple provides you with an rf modulator as well as the normal composite output jack. If you wish to use a color monitor instead, you can just tap pins 12 and 13 on the video expansion port (with a shielded 75-ohm cable). This will provide you with standard composite color output. It will also mean you can't use the rf modulator at the same time.

The Big Picture

Where does all this information leave you? Simply put, if you are going to use your Apple for text work, as you would be doing if you wanted to use it as a writing tool, a television

set would definitely not be a possibility. The limited bandwidth and resolution preclude anything but graphic work.

Even a composite color monitor couldn't be used if your final objective were an 80-column screen display. While this type of a display device can have the resolution needed, its bandwidth is usually not much greater than that of a television set.

Using an RGB monitor can alleviate that condition while still providing color output. But is color a requirement for word processing? Hardly.

A composite monochrome monitor is readily available and usually in the \$200 range. It will accommodate both text and graphics (though not in color) and is suitable for both 40- or 80-column modes.

The Fly in the Ointment

A thread running throughout this discussion has been the option of an 80-column display. It's a touchy subject for some who claim it really isn't necessary. Apple Computer tends to disagree with that assumption.

Consider the Apple //c. With all of the possibilities, and limitations, involved in packing functions into a portable computer, Apple chose to include 80-column capability. That step is significant to the future of the Apple II series.

Both Apple's new Monitor // (for the //e) and its smaller cousin for the //c are excellent choices, as is the Amdek 300A I find myself relying upon more and more often. Which brings us to another aspect of monochrome video displays.

Monitor Headaches

At one time, it was perfectly acceptable to use the term "black-and-white" monitor when referring to a non-color computer display device. It was an accurate expression, since characters were displayed in white against a black background.

Then something strange happened. People began to get paranoid about the monitors. Fears ran all the way from genetic damage and cataracts from radiation, to simple eyestrain and headaches. There's no getting away from the fact that at least the

latter, eyestrain and headaches, do actually occur.

Without getting into a major discourse (and, perhaps, a major argument) over the effects of VDT's (video display terminals) on eyes, let's simplify the matter. The public (you and I) were not prepared for them. We exist, usually, in an environment consisting of poor lighting, improperly arranged. Also, a disproportionate amount of that lighting is supplied by fluorescent lamps.

This type of bulb has an inherent flicker of 60 Hz (60 times per second), the frequency, in the United States, of the line voltage. Many people have difficulty working under those conditions alone.

When you add to it the fact that the physical display on a VDT is erased and rewritten 60 times per second (it's called the refresh rate of the device), there just has to be trouble. Now picture the environment it's placed in.

When using a typewriter, you usually look down at the document (and the keyboard, if you're so inclined). Because of the way your back is arranged, while you're working you look up, perhaps from side to side at your surroundings or the notes you're typing from—it all relieves your eyes from the burden of constantly staring at the page.

A computer dominates your environment. The display portion is usually placed at eye level and it dominates your field of vision. You may see things on the periphery of your vision, but while you're working, it's what you're seeing most of the time.

Keyboards are rarely placed at the correct height (the term "desktop computing" didn't emerge by accident). This affects your posture. So you have flickering background lights, flickering displays, and bad posture.

If you expect those to add up to a good experience, you're sadly mistaken.

Consumer education began on the wave of complaints. Cottage industries evolved whose only function was to design the perfect environment for computer use. Lectures and seminars were given to explain the correct arrangement and lighting for computer rooms.

Monochrome Colors

The display manufacturers, realizing the benefits of mental health, developed a green monitor, which showed green characters on a black background. They claimed it helped with the eyestrain. It did, partially on its own and partially due to the other changes made. To add to it, they also brought out an amber monitor for those who still thought the situation was terrible.

White, green, or amber—I'm not convinced it really makes a difference. The last study I read claimed that there were no harmful effects to be found in VDT's themselves. I'm half given to believe that most of the alleged benefits are psychological. The one for you is the one you feel most comfortable with, but that involves yet another factor.

Persistence

Another feature found in all monitors bears mention. It's called persistence. Your eyes have this same feature, and it causes them to retain the last image you see for a fraction of an instant longer than the image truly appears. It's one of the reasons you don't consciously notice when the screen is refreshed.

This feature is also built into monitors. When the screen is erased, the image tends to fade at a variable speed, depending on the rating of the monitor. It can be of either short, medium, or long persistence.

When looking to purchase a monitor, its persistence should be taken into account. In general, monitors with a medium rating have proven fine, and some computers, like the Apple /// Plus, require them for the best display characteristics.

Your eyes play an important part in this selection, since their persistence can differ from individual to individual. The monochrome display on the IBM PC, a green-phosphor long-persistence unit, is uncomfortable for me—but many people find it excellent.

Other Alternatives

The Apple //c, if it hasn't already, will shortly offer another complication, the flat panel liquid crystal display (LCD). You've seen this type



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before in most digital watches, but the cost of the technology had not made it practical for large scale computer use. Also, LCD tests were never among the most stringent in the industry. The truth is that many of the testing procedures that could have been used would have destroyed the device itself.

The LCD device for the Apple //c is a full 80-column-by-24-row display system which plugs into the video expansion port. If nothing else, it will make the machine truly portable.

The obvious problem, of course, is that there is no inherent lighting from an LCD screen. And, because of the reflective properties of the liquid crystal material itself, room lighting will play an even more important role in correctly using it. A similar screen is currently used on the Sharp lap computer, and it can get a little tedious at times.

Conclusion

When it comes down to the line, you'll have to be your own judge, and that means investing some time in the decision making process. There is no way short of sitting in front of a monitor and using it to make a decision which is right for you. And don't allow price concessions or sales monologues to interfere with your selection.

IN THE NEWS

If you have children and you want to introduce them to your Apple, I urge you to take a look at Scholastic's Fact and Fiction Toolkit. It uses icons, up-and-coming Apple tools which are really just pictorial representations of things, to create graphic scenarios. These can be tied together into a story and emphasized with text. The variations are immense.

Almost overshadowed by the storytelling fun is the introduction to data base technology—all done on a child's level. The program actually allows the child to collect, store, and retrieve information. Can you imagine how well off you'd be now if you had that type of tutorial when you were young?

Until next time, enjoy, be frugal but knowledgeable in your purchasing, and above all—make mine Apple. ■



Pinball Power

The scene is a dimly lit room in a New England college student center, 1971. A lone figure battles his addiction. He pours his mind, his energy, his sweat, and his money into his habit. He's tried to kick it several times, but each time the craving gets worse and worse. Begging for a "play," he comes crawling back for more.

Alone, the addict now sets out to confront his personal demon. He forks over the money. He rolls up his sleeve. He starts shooting!

Suddenly his features relax as the rush calms him out. The sound of bells and buzzers (yeah, this is pinball... what did you think it was, drugs?) floods the room and young Warden Shiftky embarks on another futile attempt to conquer Williams' "Ding Dong."

It's been a long time from then to now, and I have managed to get my pinball addiction under control, but the game has never lost its fascina-

tion. That is why the development of ultra-realistic pinball simulations poses a major threat to the Shiftky fortunes. When I sit down at the Apple II to do some work, it takes a major effort of will to boot up Screenwriter II, instead of David's Midnight Magic or Pinball Construction Set.

Continued on p. 35.

The Warden checks often at the base lodge for mail. Write him c/o inCider, 80 Pine Street, Peterborough, NH 03458.



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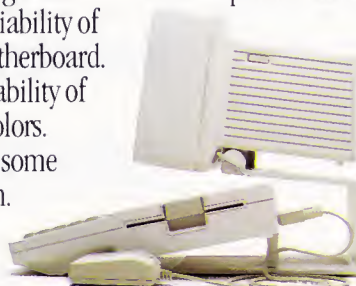
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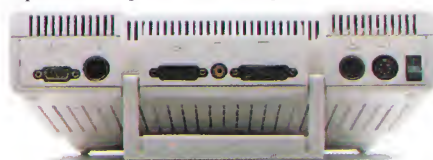
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* Don't asterisks make you suspicious as all get-out? Well, all this one means is that the IIc CPU alone weighs 7.5 pounds. The power pack, monitor, an extra disk drive, a printer and several bricks will make the IIc weigh more. Our lawyers were concerned that you might not be able to figure this one out for yourself. ** The FTC is concerned about price fixing. So this is only a Suggested Retail Price. You can pay more if you really want to. Or less. © 1984 Apple Computer, Inc. Apple, the Apple logo and ProFile are trademarks of Apple Computer, Inc. CP/M is a trademark of Digital Research Inc. For an authorized Apple dealer nearest you, call (800) 538-9696. In Canada, call (800) 268-7796 or (800) 268-7637.

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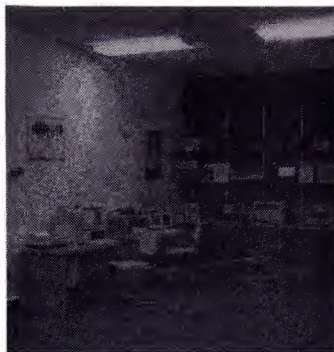
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Continued from p. 31.

Pinball is a game of luck and skill. The breakdown is about 50 percent luck and 50 percent skill, on the average, although a person who has neglected his work, studies, or other gainful pursuits can beat a machine.

Object of the Game

Rolling over the machine is one elusive goal of all pinball players. That's when the counters on the score display go one digit past 999,999 or 9,999,999, depending on the game, and reset to zeros. This is as good a definition of winning in pinball as ever you'll find.

Another goal is the free game. That's achieved by racking up a high score—though not necessarily enough to roll over the score counters. In real pinball, nobody makes machines that fork over free games anymore (or games that play for a dime, or give you five balls to start with). In computer pinball, I found one game that did. For players with modest abilities, winning means "clipping," getting an extra ball or a "Shoot Again" signal. Opportunities for that abound in computer pinball.

What makes a game great? First and foremost the game has to be fair. A game that drops the ball down the center chute too quickly on every play is not very much fun. The player must have a fair chance to catch the ball on the flipper and keep it in play.

The game should not be over-generous. If, after a minute of action and two balls gone, you have already racked up 450,000 points, the challenge dies. It's no test of skill if the machine makes it impossible to do badly.

Next, the best point-scoring features on the game must be hard to hit or positioned very close to a dangerous feature, like the bumper or a target that sends the ball down the middle where your flipper can't hit it. Also, the high scoring features are more fun if they can only be hit by a ball that is hit off the very tip of the flipper. This requires the player to hold off on pressing the flipper button until the last possible second.

Speed of the game has to be just right. If it is too fast, the ball moves in a blur and your flipper shots become random rather than skillful. A game

that proceeds at the right speed offers not only the fun of timing your flipper shots but also the suspense of watching the ball bounce hesitatingly on the top of a gate or a chute, as if deciding whether to go down the side with the lit Special or down the tubes.

Let's look at three games and a do-it-yourself program that meet these standards.

Raster Blaster

Programmer Bill Budge startled quite a few Apple owners back in 1981 with this state-of-the-art simulation. It achieved a level of realism that no other game software had ever approached before. Raster Blaster is based on a real arcade pinball playfield (or else the exact duplicate I found in a New England coin arcade was based on Raster Blaster) and the play qualities of the game are exactly those of the real game. In fact, I found myself performing at about the same level with the computer game as with the real game.



Raster Blaster

In Raster Blaster, Budge is the first to make the ball behave as if it were on an actual playfield. With uncanny precision, Budge simulates gravity, the motion of spinner gates, the lighting of the bumpers when they are struck, and the action of the flippers.

You have to admire the look of the game. Until Raster Blaster came along, computer pinball games were clumsy lo-res affairs. Having become used to that sort of simulation, Raster Blaster came as a real shock. Skillfully using the Apple's hi-res graphics, Budge made his game look amazingly like a real machine. The detailing is minute, especially when

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the game is in action. It is a mesmerizing experience.

Admiration of the look of the game gives way to appreciation. Budge masterfully duplicates the play qualities of a really good arcade game.

Sadly, the game is no longer available. BudgeCo, the publisher, stopped selling it in September, 1983. I hope the decision is not final. It's true that the subsequent work of Bill Budge has made this game obsolete. But, as a thing of beauty and a joy to play, it deserves to live on.

David's Midnight Magic

It wasn't long after Raster Blaster that a new and better game came along, David's Midnight Magic by David Snider. Raster Blaster is a good representation of a conventional pinball game that depends on top lanes, bumpers, and one set of flippers for the action. Snider's game is representative of advanced playfield designs, which appeared in the late 60's and early 70's.

The playfield is divided into two distinct halves, each dominated by a set of flippers. In effect, there are two games here. On the top half, the main objective is to keep the ball from going straight down the pipe when it enters the game. If you keep the ball at the top, you try to knock down five targets at the right and four at the left (for 5000 and 3000 points and 5 and 3 bonus points, respectively), and to deposit it in a ball collector at the left for 10,000 points and 10 bonus points. When three balls are deposited, all are released into the playfield for a riot of action.

The object of play in the lower half is to knock down two additional sets of targets which pay off with similar bonanzas of points and bonuses. There is also a loop which yields 5000 points and multiplies the bonus points. The nice thing about the loop is that it's located dangerously. Hitting it wrong can sometimes pipe the ball out of the game. So can hitting a solid shot right into the loop. It will come out of the other end just beyond your flippers.

There are lots of other action features, including plenty of rollovers which score 1000 points plus a bonus point and a target hole that releases the balls in the collector.



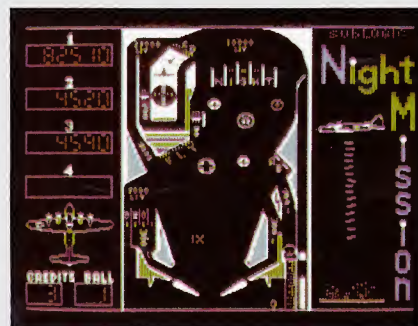
David's Midnight Magic

There is a Magicsave (enabled by dropping the appropriate targets) which prevents balls from dropping out by the side chutes.

Midnight Magic is a better simulation than Raster Blaster. The graphics are as good and the action of the ball is ultra-realistic. As for play value, what else can I say except that I believe that Midnight Magic is the most addictive game ever produced for the Apple II. It requires strategy and timing to play well, but even if you don't play well, you're likely to run off dozens of games before you or your fire buttons give out.

Night Mission Pinball

The most complex of the Apple pinballs is Night Mission Pinball by Bruce Artwick. It may not be as beautiful as Raster Blaster or as perfect a simulation as Midnight Magic, but it is complicated enough to place it in a class by itself. The theme of the game is a mission of bombers, and figuring out all the playfield features is as difficult as a bomb run in the dark. I won't attempt to tell you what all the game features are; there appear to be about 36 in all. Let's go over the most important ones.



Night Mission Pinball

The most important features are the rollover and drop targets. The NIGHT rollovers score 10,000 points and light the city targets in the long chute at the top left. The ABCD, FLY, and NIGHT drop targets score bonus points. Knocking down the ABCD drops multiplies the bonus points. Some of the other features include: multi-lane rollovers feeding the left flipper, a hole kicker with delayed action at the bottom of the right chute, very lively bumpers, and a ball catcher.

Night Mission is unique in that the game can be endlessly modified by typing FIX before playing. This presents you with a two page menu of adjustment options which the game manual explains. Choices include: high and low speed, self-play demo, various difficulty levels, and a Cosmic mode which provides very interesting graphic effects as play proceeds. You adjust the score needed for a free game, number of balls per game, gravity effect, spinner gate speed, tilt, kick, bonus counts, bumper kick, and so on. The default values of the game as it is sold are set to provide realistic, very challenging play.

Pinball Construction Set

Of course you may not think that the playfield of any pinball game you've seen is interesting. Or you may wish that someone had programmed a game just like the favorite you used to play years ago. Well, if you can remember what the playfield looked like, chances are you can duplicate it using Bill Budge's Pinball Construction Set, a program regarded by many as the single most advanced example of entertainment software produced for the Apple II.

There is a playfield to the left of the screen, devoid of features except an enclosing wall. To the right is a complex display of pinball parts: bumpers, kickers, gates, ball catchers, magnets, and spinning gates. To the right of all this is a column of icons—that is, a pictorial menu.

Now if you've ever spent time fiddling around with Macintosh's drawing program, you've got a good idea of how PCS works. Just position the cursor (a pointing finger) over the appropriate icon and you perform that

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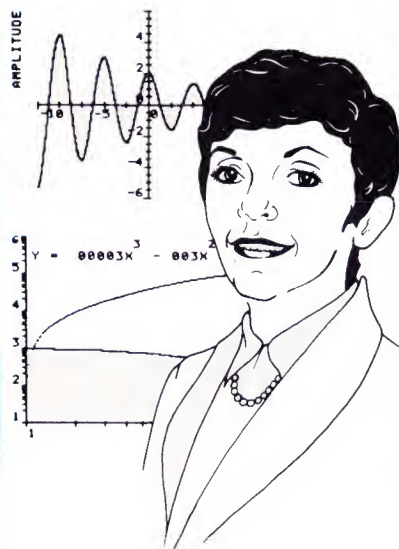
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Pinball Construction Set, workspace

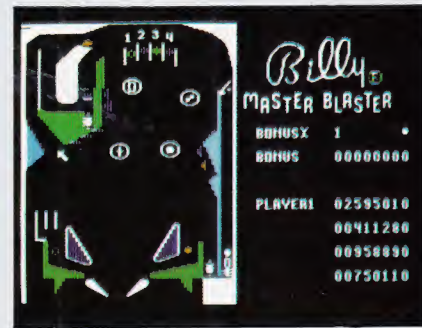
function. The top icon allows you to move parts onto the playfield (you have an unlimited supply of everything). Then locate, stretch, compact, and mold features as needed, and "paint" them in desired colors.

The bottom icons allow you to make fine adjustments in the game and set up the system of specials. Any three features can be wired on one circuit for extra points or bonuses. You can customize the sound effects and points for any feature. You can also change the physics of the game: increase or reduce gravity, alter the kick and elasticity of various features, and change speed.

Using a truly marvelous graphics utility, you can paint details one pixel at a time. A magnified view of the playfield lets you change colors to neaten the appearance of the game and even to make some features invisible! I designed a game with invisible bumpers that produces some of the oddest effects I have ever seen.

Perhaps the best feature is that you can save your custom designed game in as little as 8 sectors of disk space, using the PCS as a master. This means you can save 40 of your original creations on one disk to play at will!

The Warden could easily do another two thousand words on the PCS. I agree with everyone else that this is the most advanced entertainment package ever produced for the Apple. Advanced as it is, it is also one of the easiest to use. After two hours of practice, I was creating games at the rate of one every 45 minutes. Some were real "keepers" as we call them here on the Reserve. Pinball Construction Set is so advanced and so much fun, I even recommend it for



Pinball Construction Set, sample game

people who don't like pinball! The fascination of working with this program is worth the price of admission.

Happy Trails

With that, the Warden must close. Next time I'll be looking at a few of the newest games. Until then, here are the manufacturers you can contact for the games we profiled this month. Aloha. ■

Featured Games

David's Midnight Magic

Broderbund Software, Inc.
17 Paul Drive
San Rafael, CA 94903
\$34.95

Night Mission Pinball

SubLOGIC Corp.
713 Edgebrook Drive
Champaign, IL 61820
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Pinball Construction Set

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2755 Campus Drive
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Decisions, Decisions...

In my July column, which began this current series on elementary programming principles, I presented a chart showing the five major operations that a computer can perform. Those operations are:

Input
Sequential Processing
Decision Processing
Loop Processing
Output

That column and last month's column presented sample programs incorporating specific input, output, and sequential processing commands: the INPUT command for keyboard entry of data, the PRINT command for video display output, and various sequential processing commands involving assignment statements, simple math functions, and the INT function.

This month I'll begin describing the third type of operation in the above list, decision processing. Along the way I will cover the concept of flowcharting and try to convince you of the vital importance of this tool in designing computer programs. The sample program in this month's column illustrates how a number of relatively simple decisions can be joined to produce fairly impressive results, and how a flowchart can make the design of such a program easier to create and understand. The program uses subroutines and REM statements in adherence to the structured programming concepts that I emphasized last month.

IF...THEN...(ELSE)...

Computers just wouldn't be computers without the ability to make decisions based on simple comparisons. In fact, such decisions have been integral to computing since the dawn of time. Consider the Chinese shopkeeper with his abacus. In counting objects he must lift one bead at a time along the wire to the top of the frame. IF all beads on a given wire have been lifted, however, THEN he must raise one bead on the next wire and lower all of the beads on the first wire back to their original positions.

With BASIC, decisions can be based on more complex comparisons; just how complex depends on the imagination and skill of the programmer. There is only one decision statement available to BASIC, although in some versions, including Applesoft, it requires special handling due to a built-in limitation of the dialect.

The generalized form for a BASIC decision statement is:

```
IF <comparison> THEN <command 1>  
ELSE <command 2>
```

Command 1 will be executed only if the comparison expression (such as $A = 15$) is true. Command 2 will be executed only if the comparison expression is false. These commands may be any valid BASIC command including PRINT, INPUT, GOTO, GOSUB, and assignment statements. The key to successful decision processing lies in how the comparison part of the command is designed.

The comparison part is an expression that compares the values of variables and/or constants and yields a "true" or "false" result. For example, suppose you are using the variable A in your program. The program must carry out command 1 if A has a value of 15, and command 2 if A has any other value. You would write your decision statement as:

```
IF A = 15 THEN <command 1> ELSE  
    <command 2>
```

The value for A is either 15 or it isn't. There are no other possibilities. So the comparison expression is either true or false.

In addition to "equals" (=), other *relational operators* are available. They are listed in **Table 1**. (Note that some of these operators incorporate two symbols, such as the "not equal" operator, <>.) Because of the versatility of the relational operators, you could carry out exactly the same operation as that described above with the following statement:

Table 1. BASIC's relational operators for use in IF <comparison> THEN ... expressions.

Operator	Operation
=	Equal To
< > or <>	Not Equal To
<	Less Than
>	Greater Than
<= or =<	Less Than or Equal To
>= or =>	Greater Than or Equal To

by Dan Bishop

```
IF A <> 15 THEN <command 2>
ELSE <command 1>
```

This is important to keep in mind, because often one approach to a comparison will prove more efficient than another.

Now, before you jump over to your Apple keyboard and start writing the most fantastic decision processing program ever created, you need to know that Applesoft doesn't work quite the same way as the above examples, because it does not support the ELSE part of the statement. (In fact, even with versions of BASIC that do support ELSE, its presence is optional.) Instead, when the comparison is false the computer simply ignores anything that follows the word THEN on that program line and goes on to the next line.

This situation presents no problems if you want to carry out a single additional command when the comparison is true and then proceed with the program. (Remember, you can change the operator to reverse the comparison for a true result to fit the above requirements.) However, in many cases you will want to perform one operation if the comparison is true and a different operation if the comparison is false. Without the ELSE capability, you need to "leap-frog" over the false operation by using a GOTO command. Your program code would look like this:

```
140 IF <comparison> THEN
    <command 1>:GOTO 160
150 <command 2>
160 .....
```

In effect, line 150 contains the ELSE part of the decision process. Line 160 contains the next statement in your program that will be executed regardless of the outcome of the comparison in line 140. Note that the statement following the word THEN in line 140 actually consists of two commands, separated by a colon. Since the computer ignores the entire line if the comparison is false, you can place as many commands on the line as you wish (up to the 239-character limit for a line), using colons to separate them.

Many programs written in Applesoft BASIC use a "double jump" approach to handling decision processing. This is illustrated by the following example:

```
140 IF <comparison> THEN GOTO 190
150 <command 2a>
160 <command 2b>
170 <command 2c>
180 GOTO 220
190 <command 1a>
200 <command 1b>
210 <command 1c>
220 .....
```

Lines 150 through 180 are carried out only if the comparison proves false. When this set of instructions is completed at line 180, the computer goes to line 220, jumping over the instructions reserved for the true result. Lines 190 through 210 are the block of instructions to be carried out if the comparison is true. Upon completing this set of commands, the computer simply continues on with line 220.

My opinion is that this approach becomes difficult to follow in many cases and violates sound structured programming principles. If you have more than two or three short commands to be carried out when the comparison is true, you should place those commands in a clearly marked subroutine. Use another subroutine to handle the instructions to be performed if the comparison is false. Then you can always use the decision structure:

```
140 IF <comparison> THEN
    GOSUB ... :GOTO 160
150 GOSUB ...
160 .....
```

The ellipses (...) in lines 140 and 150 represent the line numbers of the first line in each of the two subroutines referenced. Line 160 contains the first instruction to be executed by the program regardless of the outcome of the decision in line 140.

Note that the coding is clean and compact. Only one GOTO is needed, and the GOTO always references the second line following the line with the decision. This technique also adheres to the concept of writing a program in functional modules, and makes it very easy to change either subroutine to meet new requirements.

Flowcharts— The Programmer's Tool

In my August column I introduced hierarchy diagrams to help identify the functional parts within a pro-

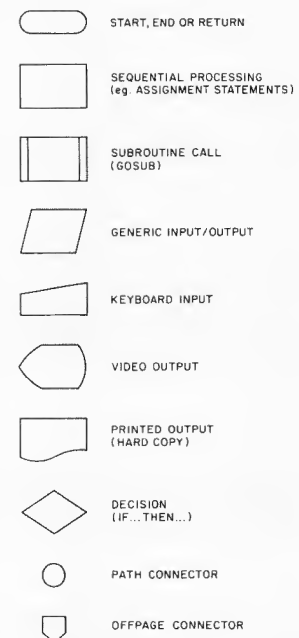
gram. Once these functional units, or modules, are recognized, the programming task is simpler because each of the modules can be treated as a short self-contained program (or subroutine) and coded with little regard or reference to the rest of the program.

Before writing the actual code for these modules, however, the programmer will usually take one additional step. He or she will diagram the flow of logic and instructional steps needed to get the computer to accomplish the given task. The end product of this process is called a *flowchart*. Each processing step is represented by a symbol keyed to the type of processing involved. (Refer to **Table 2**.) The symbols are connected by lines or arrows. The flowchart can be considered a kind of road map.

There are several reasons for tak-

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Table 2. The most frequently used flowchart symbols. Note that the parallelogram can be used for any input/output process, including keyboard entry, video, or hard copy output.



ing the time to flowchart a program before actually writing the BASIC code. The first is that the resulting diagram represents each step that must be taken by the computer. This makes it much easier to check the program design for loose ends, mistaken logic, and so forth.

Second, writing the actual BASIC code from a previously prepared flowchart is fast and much less prone to error. Third, a flowchart

provides excellent documentation of a program, making it easier for changes to be implemented at a later date, especially if those changes must be made by someone other than the original programmer.

Finally, a flowchart is not dependent on a given machine or, for that matter, a specific language. The logic necessary to accomplish a task will be nearly the same in all computer languages, even though the languages themselves may be quite different. A well-written flowchart can serve as the basis for writing a program in a variety of languages.

Refer once more to the symbols in **Table 2**. Program execution begins at the starting symbol (an oval) and proceeds following the arrows from symbol to symbol. Each symbol has a single arrow entering it and a single arrow leaving it. If the type of processing involved in a given step is keyboard entry, then either the parallelogram or the keyboard symbol represents it. Printing a report is shown by either the parallelogram or the printed output symbol, displaying a message or results on the video screen by the parallelogram or the video output symbol, and assignment statements by a rectangle. And if the step includes a GOSUB statement that calls a subroutine, a rectangle with bars down both sides is used. Of course, this means that another separate flowchart must be written for the subroutine itself.

Up to this point the path has been easy to follow, because all of the processing symbols have had a single

arrow leading in and a single arrow leading out. Kind of hard to get lost that way.

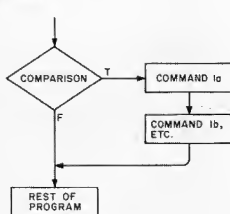
But now refer to **Figure 1**. A decision symbol always has two arrows leading out of the diamond, one marked T or Y for "true," and the other marked F or N for "false." The road temporarily branches into two paths. Just which path the computer takes is determined by the outcome of the comparison represented within the decision symbol.

Good structured programming techniques require that the two paths join again later in the program. A small circle is often used as the "connector" (as in **Figure 3**).

A second connector is also needed for those situations where a flowchart does not fit on a single page. The pentagon is used here, with the pointed end directed toward the edge of the page. Usually a letter or other mark is placed inside the corresponding symbols on each page so the associated connectors can be readily matched. The flowchart in

Figure 1. Common flowchart structures for the IF...THEN... and IF...THEN...ELSE... decision processing functions.

IF...THEN...



IF...THEN...ELSE...

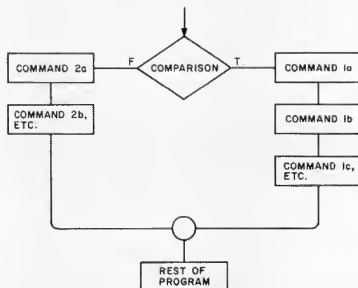


Figure 2. A hierarchy diagram for the date entry verification program presented in the accompanying listing.

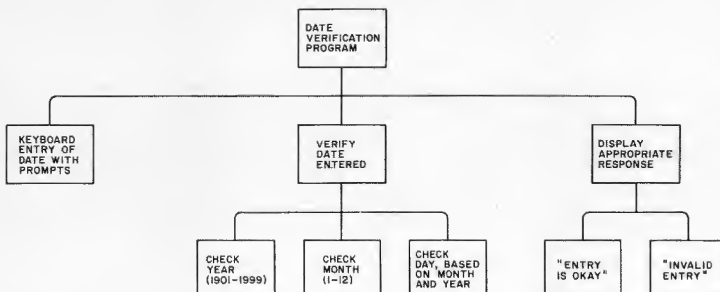


Figure 3. The flowchart for the main program sequence (lines 100-170) in the date verification program.

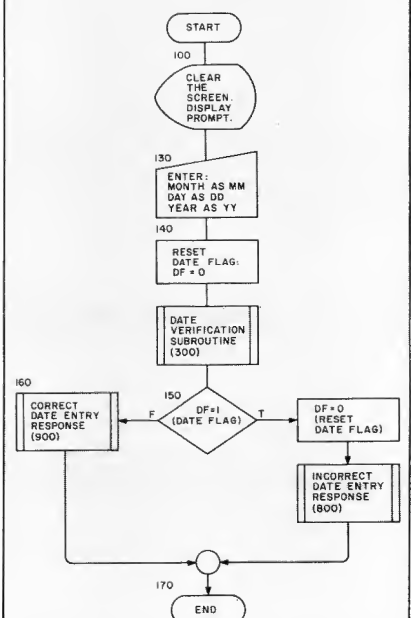


Figure 4 has been purposely done in two pieces to illustrate this technique.

A few additional comments are needed regarding the use of flowchart symbols. Recent convention dictates that whenever two or more arrows from different parts of a program converge on a single symbol, the arrows connect ahead of the symbol to form a single arrow impinging on the symbol. The major flow of logic through the chart should be either left-to-right or top-to-bottom. Overlapping arrows going in different directions should be avoided like the plague! The direction of T and F arrows leaving a decision symbol is not important, as long as they depart from an unused point on the diamond and are properly marked.

Finally, a flowchart should incorporate descriptive terms within the symbols to explain what is to be done at that point in the program. And they should be in plain English wherever possible, so they're not just repeating the code that will appear in the program. The value of the English explanation will become apparent when you go back to work on a program that you "finished" several months earlier.

Date Entry Verification

One of the most frequent uses for decision statements in a computer program is in data entry verification. Too many things can go wrong in a program if the person who enters data makes a mistake. So, nearly every keyboard input statement must be followed by a routine to ensure that the data entered is at least reasonable. If the data does not fit the specified criteria, the operator is prompted to re-enter the information. Otherwise, the program continues.

The **Program listing** presents a sample program for checking the validity of a date. **Figure 2** is the hierarchy diagram for this program, showing how the program task can be broken down into simpler functional units. **Figures 3** and **4** are the flowcharts for the main program and for the date verification subroutine, respectively.

One technique applied to this program that is helpful in many programming situations warrants mentioning. The problem involves communicating the result of a decision made in a subroutine back to the main program. One method for effecting this involves defining a *flag* variable. The variable DF serves this purpose here. DF is initially set to zero (line 140) before the date verification subroutine is called. Then, if anything is found wrong with the date, the value of DF is changed to one from within this subroutine (line 690). Immediately upon returning from the subroutine, the main program checks the value of DF (line 150) and takes appropriate action.

You might also notice a peculiar feature of lines 300-400. Each of these lines involves a decision structure, yet there is no visible BASIC command after the THEN in any of them. Not to worry! BASIC allows a line number to follow the word THEN without a GOTO. The GOTO is understood, even if it doesn't actually appear.

Logical Operators

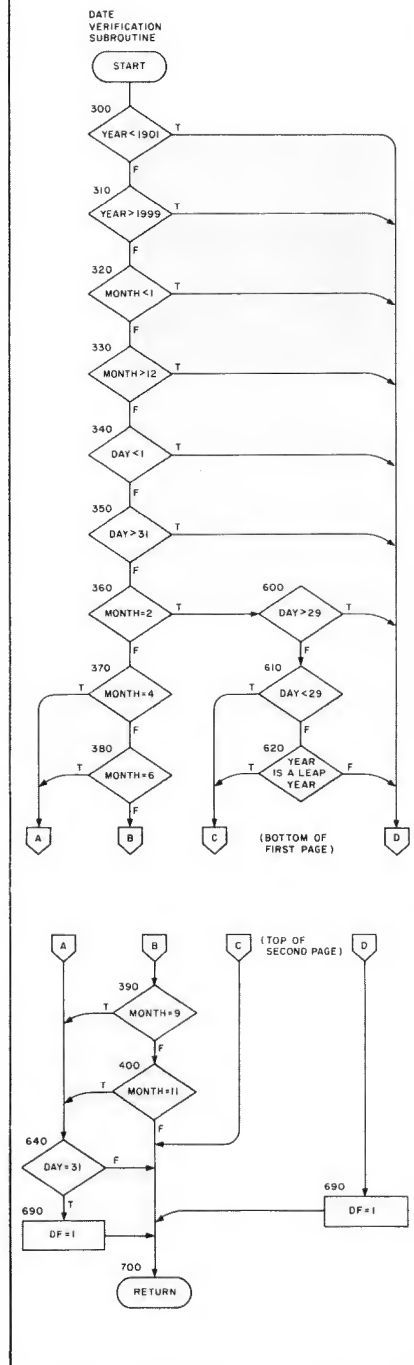
Table 1, as mentioned, lists all of the relational operators that BASIC can use in decision statements. These operators tie two variables, constants, or expressions together for a comparison, with a result of either true or false. BASIC also provides three *logical operators* for relating two or more comparison expressions. These are AND, OR, and NOT. The result of using such a "logical" expression is also either true or false. Using logical operators along with relational operators can greatly simplify programming tasks.

For example, consider the **Program listing**. Note the number of comparisons required between lines 300 and 650 in order to verify the date entered in line 130. The following line could be used to completely replace lines 300 to 350:

```
300 IF (YY<1901 OR YY>1999)
    OR (MM<1 OR MM>12) OR
    (DD<1 OR DD>31) THEN DF = 1
```

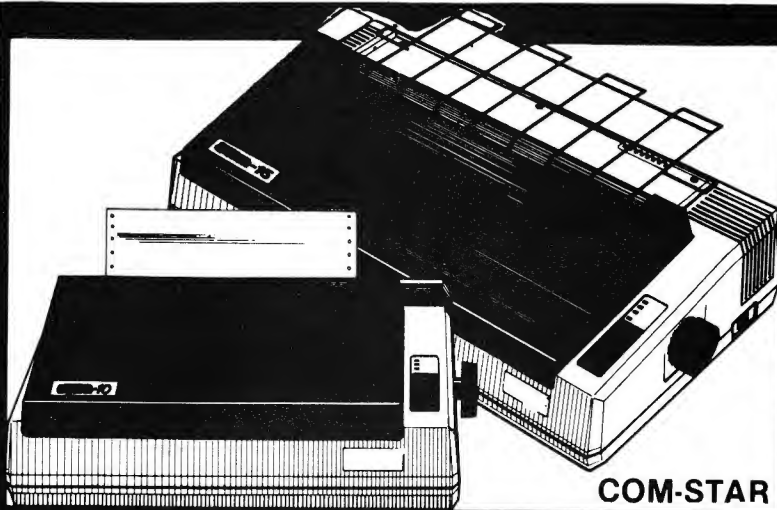
The OR operator yields a "true" if *either* of the two comparisons is true. Similarly, lines 360 through

Figure 4. The flowchart for the subroutine in the date verification program that determines whether a date of the form MM,DD,YYYY is a valid date. The flowchart corresponds to lines 300-700 in the listing. It is purposely done in two pieces to illustrate the use of over-the-page connectors.



Continued on p. 46.

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Continued from p. 43.

700 could be combined in the following expression:

```
310 IF (DD=31 AND (MM=2 OR MM=4
    OR MM=9 OR MM=11)) OR (MM=2
    AND DD>29) OR ((MM=2 AND DD=29)
    AND INT(Y/4 + .001) <> Y/4) THEN
    DF=1
320 RETURN
```

The AND operator results in a true condition for the expression only if *both* of the connected comparisons are true. It's not always that so many lines can be compressed into so few, but such combinations of logic operations within a decision statement usually reduce the necessary coding.

Conclusion

If you do very much programming, you should definitely develop the habit of working out a flowchart before sitting down at your computer to create code. The time you will save later on as your programming projects become more complicated will more than compensate for the time and effort you expend now. You should also purchase one of the plastic programmer's templates. They cost less than \$5 and enable you to outline flowchart symbols quickly and neatly.

Next month I will introduce string variables and the RND function for generating random numbers. With these, we can write a simple game program in which the computer randomly generates a number and prompts the user to guess what it is. The computer will then respond with "guess higher" or "guess lower" after each try that doesn't hit the mark, and will keep track of the number of guesses made before the right one. You might work on the program between now and then and compare your results next month with mine. ■



Program listing. The date verification program. A date, entered as MM,DD,YYYY, is checked to determine if it is a valid date within this century.

```
1 REM DATE ENTRY VERIFICATION ROUTINE
2 REM A DATE IS ENTERED AS 3 NUMBERS.
3 REM MM - MONTH; MUST BE BETWEEN 1
4 REM AND 12.
5 REM DD - DAY; MUST BE BETWEEN 1
6 REM AND 30, 31 OR 28 OR 29,
7 REM DEPENDING ON MM AND YY.
8 REM YY - YEAR. MUST BE BETWEEN
9 REM 1901 AND 1999.
11 REM DF - DATE FLAG. DF=1 FOR
12 REM INVALID DATE ENTRY.
99 REM ***** MAIN PROGRAM *****
100 HOME
110 PRINT"ENTER ANY DATE FROM THIS"
120 PRINT"CENTURY. ENTER AS MM,DD,YYYY ."
130 INPUT"DATE... ";MM,DD,YY
140 DF = 0: GOSUB 300: REM VERIFY DATE
150 IF DF=1 THEN DF=0:GOSUB 800:GOTO 170
160 GOSUB 900
170 END
298 REM *****
299 REM DATE VERIFICATION SUBROUTINE
300 IF YY<1901 THEN 690
310 IF YY>1999 THEN 690
320 IF MM<1 THEN 690
330 IF MM>12 THEN 690
340 IF DD<1 THEN 690
350 IF DD>31 THEN 690
360 IF MM=2 THEN 600
370 IF MM=4 THEN 640
380 IF MM=6 THEN 640
390 IF MM=9 THEN 640
400 IF MM=11 THEN 640
410 GOTO 700: REM DATE ENTRY IS OK.
598 REM * * * * *
599 REM FEB. LEAP YEAR CHECK
600 IF DD>29 THEN 690
610 IF DD<29 THEN 700
620 IF INT(YY/4 + .001)=YY/4 THEN 700
630 GOTO 690: REM DATE IS NOT VALID.
638 REM * * * * *
639 REM APR, JUNE, SEPT & NOV CHECK
640 IF DD=31 THEN 690
650 GOTO 700: REM DATE ENTRY IS OK.
690 DF=1: REM INVALID DATES ARE SENT HERE
700 RETURN
797 REM *****
798 REM INCORRECT DATE ENTRY RESPONSE
799 REM DF=1 IS TRUE (LINE 150)
800 PRINT
810 PRINT"SORRY, BUT THAT IS NOT A"
820 PRINT"VALID DATE."
830 RETURN
897 REM *****
898 REM CORRECT DATE ENTRY RESPONSE
899 REM DF=1 IS FALSE (LINE 150)
900 PRINT
910 PRINT"THE DATE YOU ENTERED IS OK."
920 RETURN
```



Talk to Me

"Dad, why do I have to press return?"

One universal truth about kids is that they can be counted upon to ask questions. Now that my son BJ is beginning to read, his questions about the Apple are becoming progressively more difficult to answer.

"What's a GOSUB?"

And, inevitably, "What's a program? Why do you have to type all of that just to make the computer do something?" Patiently, I tried to explain how program lines act as instructions for the computer.

"Why can't you just *talk* to it with normal words?" With difficulty I maneuvered through an answer, but the seed was sown. An hour later BJ tried out a new program, Talk to Me.

I had two goals for the new program: to provide BJ with a spelling/vocabulary program and to provide appropriate visual responses to the words he typed. In short, I wanted him to be able to talk to the computer in his own language. Talk



To Me presents him with a lo-res graphics screen and a single dot. BJ controls that dot by typing various command words: GO makes the dot move across the screen, FAST speeds up the movement, UP positions it at the top of the screen, and so on.

Talk To Me is programmed to respond to 14 different words: jump,

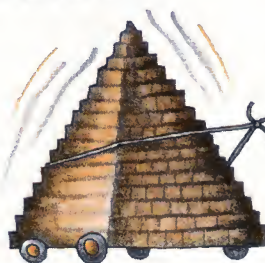
Type in this short program, and your child can communicate with your Apple in human terms.

Address correspondence to Bill Rowland at 22W420 Teakwood Drive, Glen Ellyn, IL 60137.

By Bill Rowland

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short, go, tall, fast, up, slow, down, big, right, little, left, small, and end.

The first three or four times through the program, BJ had difficulty remembering the words or how to spell them. He had to end the program and then restart it to see the word list. To overcome this problem, I added a review words option (line 120) within the main program routine. Simply typing a W shows him the available words.

Those of you with color monitors will probably want to include some color routines. First, add the new

words to the word list in the DATA statements at the end of the program 990 DATA BLUE,PINK,ORANGE,YELLOW). Next, add the color subroutines (740 COLOR=2: PLOT X,Y and 750 GOSUB 720:RETURN) and revise line 170 to include the new routines. You will have to reDIMension M\$ in line 10 if you intend to add more than five words.

I try to incorporate something new in each program I write. After reading Dan Bishop's "AppleSoft Advisor" column disdaining the use of GOTO (*inCider*, April 1983), I real-

ized that my programs had become pretty sloppy. This program uses numerous subroutines and places the main program module (lines 50-190) within an endless FOR...NEXT loop.

If your kids are a little older than my six-year-old, you may want to make the words more sophisticated. You might even try a foreign language. Children who use this program will feel a new sense of power and accomplishment as they watch the Apple do exactly what they tell it to do. ■

Program listing. Talk to Me.

TALK TO ME

```
20 DIM M$(20)
30 GOSUB 830
40 REM
```

MAIN PROGRAM

```
50 FOR Z = 1 TO 2 STEP 0
60 HOME : GR : COLOR= 15
70 X = 20:Y = 24
80 N = 0
90 PLOT X,Y
100 INPUT "TALK TO ME ";T$
110 HOME : PRINT : HTAB 18: PRINT
    T$
120 IF T$ = "W" THEN TEXT : GOSUB
    880: NEXT
130 FOR T = 1 TO 14
140 IF T$ = M$(T) THEN N = T
150 NEXT
160 IF N = 0 THEN HOME : PRINT
    CHR$(7): PRINT "I DON'T UN
    DERSTAND ";T$: GOSUB 720: NEXT
170 ON N GOSUB 600,210,300,330,3
    60,390,390,420,450,480,510,5
    40,570,190
180 NEXT
190 POP : TEXT : HOME : VTAB 8: PRINT
    "THANKS FOR TALKING TO ME": END
200 REM
```

GO

```
210 LA = 100
220 GR
230 FOR X = 1 TO 39
240 COLOR= 15: PLOT X,Y
250 FOR TI = 1 TO LA: NEXT
260 COLOR= 0: PLOT X,Y
270 NEXT
280 RETURN
290 REM
```

FAST

```
300 LA = 40
310 GOSUB 220: RETURN
320 REM
```

SLOW

```
330 LA = 300
340 GOSUB 220: RETURN
350 REM
```

BIG

```
360 FOR X = 14 TO 26: FOR Y = 18
    TO 30: PLOT X,Y: NEXT : NEXT
370 GOSUB 720: RETURN
380 REM
```

LITTLE/SMALL

```
390 HGR : COLOR= 3: FOR X = 140 TO
    141: FOR Y = 86 TO 87: HPLOT
    X,Y: NEXT : NEXT
400 GOSUB 720: RETURN
410 REM
```

SHORT

```
420 FOR Y = 24 TO 27: PLOT X,Y: NEXT
430 GOSUB 720: RETURN
440 REM
```

TALL

```
450 FOR Y = 24 TO 2 STEP - 1: PLOT
    X,Y: NEXT
460 GOSUB 720: RETURN
470 REM
```

UP

```
480 GR : COLOR= 15:Y = 2: PLOT X
    ,Y
490 GOSUB 720: RETURN
500 REM
```

DOWN

```
510 GR : COLOR= 15:Y = 38: PLOT
    X,Y
520 GOSUB 720: RETURN
530 REM
```

RIGHT

```
540 GR : COLOR= 15:X = 38: PLOT
    X,Y
550 GOSUB 720: RETURN
560 REM
```

LEFT

```
570 GR : COLOR= 15:X = 2: PLOT X
    ,Y
580 GOSUB 720: RETURN
590 REM
```

JUMP

```
600 FOR Y = 24 TO 2 STEP - 1
610 COLOR= 15: PLOT X,Y
620 FOR TI = 1 TO 50: NEXT
630 COLOR= 0: PLOT X,Y
640 NEXT
650 FOR Y = 2 TO 24
660 COLOR= 15: PLOT X,Y
670 FOR TI = 1 TO 50: NEXT
680 COLOR= 0: PLOT X,Y
690 NEXT
700 RETURN
710 REM
```

DELAY

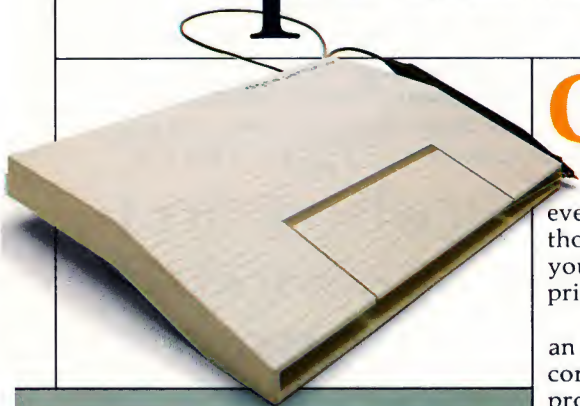
```
720 FOR D = 1 TO 3000: NEXT : RETURN
820 REM
```

INTRO

```
830 M$(0) = " TALK TO ME "
840 FOR M = 1 TO 14
850 READ M$
860 M$(M) = M$
870 NEXT
880 HOME : INVERSE : PRINT SPC(
    120)
890 LA = 100
900 NORMAL : VTAB 2: HTAB 20 - INT
    ( LEN (M$(0)) / 2): PRINT M$
    (0)
910 VTAB 5: PRINT "THESE ARE THE
    WORDS I UNDERSTAND"
920 PRINT
930 FOR M = 1 TO 14
940 HTAB 5: PRINT M$(M): NEXT : PRINT

950 INPUT "PRESS <RETURN> TO BEG
    IN ";R$
960 RETURN
970 DATA JUMP,GO,FAST,SLOW,BIG,
    LITTLE,SMALL,SHORT
980 DATA TALL,UP,DOWN,RIGHT,LEF
    T,END
```

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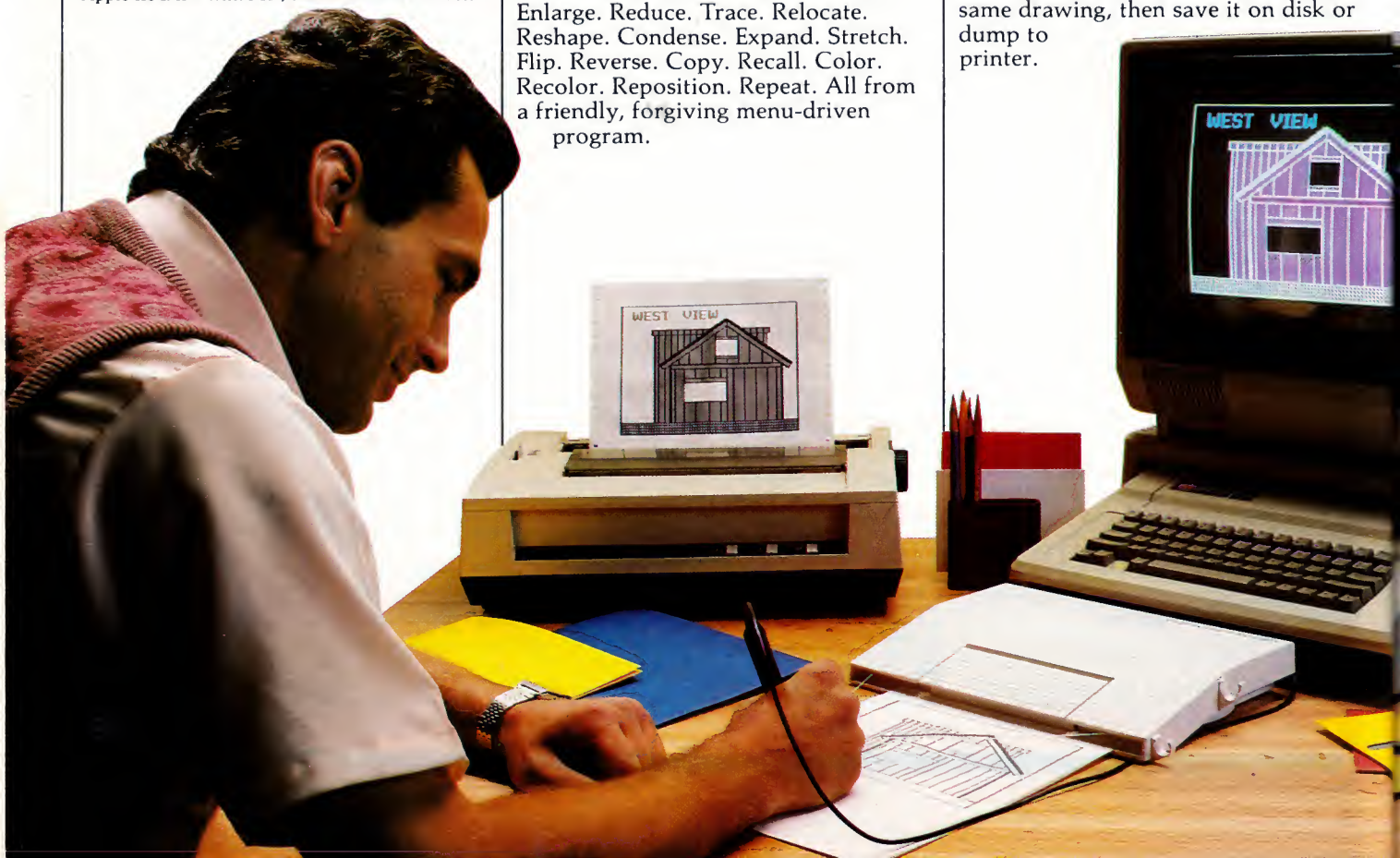
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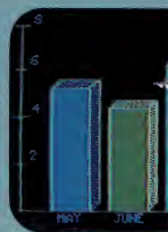
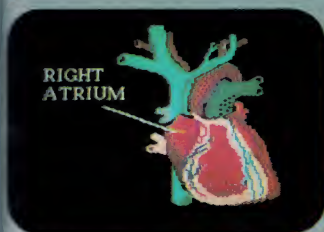
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Apples in Education

Not since the invention of movable type has a single technology had such an impact on the field of education. Even the most traditional teachers are eyeing the new machines and speculating as to how they just might help dispense knowledge and engender skills more efficiently. Meanwhile, the more adventurous educators continue to plough new ground behind your and my favorite workhorse, the Apple II. This month, we take a look at how some of them are improving the state-of-the-art in education.

On the Road to Computer Literacy look for the landmarks along the way.

by Anna Mae Walsh Burke page **54**

SuperPILOT: Between Student and Teacher write your own computer-aided-instruction materials.

by Linda J. Pattison page **57**

Populist Computing . . . a community develops its own computer education project. page **62**

Instant Alphabet . . use Logo to create letter displays for beginning readers.

by Wayne T. Blanchard page **64**

Guide to College Board Software improve your score on the S.A.T. or other standardized exam.

by Joan Witham and Bob Ryan page **69**

Apples After School . . Apple supports computer clubs for kids.

by Cynthia Carr page **74**

Photo by Frank Cordelle



HOMWORK: Read inCider—

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Wizardry



ON THE ROAD TO COMPUTER LITERACY

Are computers the keys to
the intellectual kingdom?
Perhaps, but a fundamental
approach is essential.



$E=MC^2$

Albert Einstein

C by Anna Mae Walsh Burke

omputer literacy, two words which had formerly maintained a respectful distance in the dictionary, were united in a dynamic marriage during the seventies. Like many of the marriages of the seventies, it has been a volatile union, full of uncertainty and collision. School districts have different definitions of computer literacy determining their curriculums. Some see the computer as a cure-all for the ills of education and insist that it should correct all deficiencies in reading, writing, arithmetic, and even thinking skills. This is indeed a heavy burden to place on a computer literacy program. Currently, many computer literacy programs follow a Chinese restaurant

menu approach to curriculum development. From the list of possible topics, curriculum planners select a specific number from column A and others from column B. But which ones are the right ones? In my opinion, no single computer literacy curriculum is correct for all presentations, any more than a single math course or a single English course would satisfy every student. One reason for this ambiguity is that computer literacy is offered from kindergarten through college, in doctoral level programs, adult education, day care, and senior citizen classes. Because computers have suddenly become so important and so available, everyone has had to become computer

literate all at once. The differences between programs for various ages are often not significant.

Objectives

Computer literacy programs in the schools prepare students to function as contributing members of a technologically-based society. As Daniel Boone taught his children to survive in the woods of Kentucky, we must teach our children the art of survival in the technological landscape of today and tomorrow.

To achieve this, one must first be comfortable with the computer itself. For an analogy, remember learning how to use the telephone? At a young age we were introduced to the intricacies of talking on the telephone and dialing a local number (with strict admonitions not to dial extra numbers that would lead to long distance toll calls). Gradually, we worked up to a level of complete familiarity with the telephone.

Achieving the same level of competence with computers requires that the student be placed in a non-threatening position for the first encounters. To learn programming in their initial encounter places an additional burden on students becoming computer literate.

Among the first simplistic objectives toward computer literacy is to learn what it is that the machine actually does, including its limits and strengths as well as its parts and associated peripherals.

While the computer has tremendous capabilities, certain myths have to be

removed, among them the concept that it is a giant brain *smarter* than any human (especially the one trying to learn about computers).

While inhibitions about using computers are more prevalent among older first users (anyone over the age of 12), some young people don't like computers except for playing games. This dislike stems from uncertainty and poor teaching, rather than from true dislike.

Running Programs

Once the computer is understood in broad terms, the student can use it to run commercial programs. The careful selection of programs can yield learning at several stages. A computer assisted instruction (CAI) program that introduces the student to the computer is an excellent starting point. If you have students who are especially inhibited about the computer, you might begin with games—learning games rather than shoot-'em-down or gobble-'em-up exercises. Games are valuable tools not only for the information they offer but also for the skills they develop, such as eye-hand coordination and spatial relations. Game programs can also improve thinking skills.

It is important not to schedule students to use involved software such as an electronic spreadsheet program with complex business exercises that are beyond their academic scope. Failure to adapt to the computer often comes from poor selection of initial tasks.

Additional Skills

Becoming an experienced user of computer programs demands that the

student develop additional skills beyond manipulating the keyboard, mouse, or joystick. Reading instructions, guessing what the documentation writer had in mind, manipulating devices, making quick decisions, remembering information, and thinking are involved in program utilization. Numerous skills and facts can be learned through material prepared for the computer.

Programming?

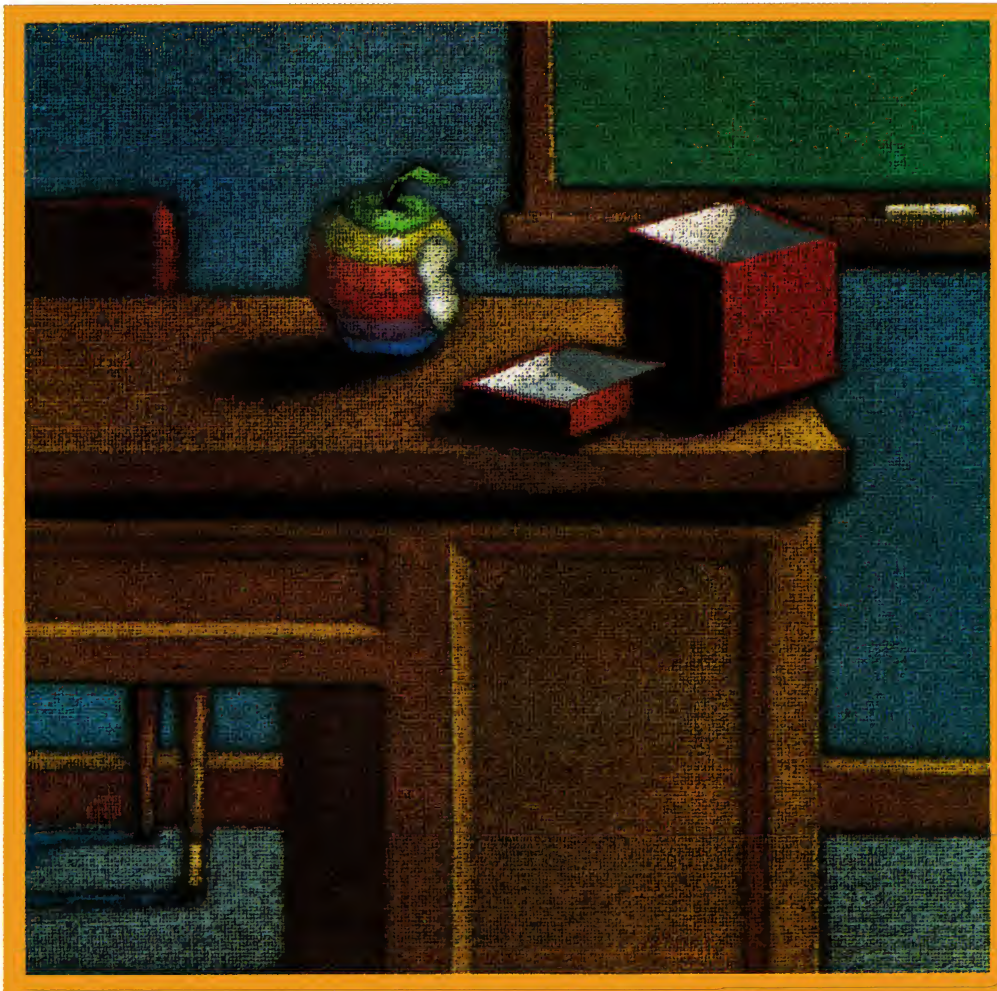
Only after students become accomplished computer users should they move to the programming phase. Many students will not reach this stage. Programming can involve the development of good thinking skills, but shouldn't be taken as a matter of course. Many students don't learn to plan ahead. They only sit at the machine, making changes until something works, thus creating patched programs that rarely take exceptions into account. The teaching of programming should be based on a firm foundation of thinking skills and not be seen as the road to development of such skills.

A computer literacy program should be dynamic enough to consider student capabilities with initial emphasis on helping students to become competent users. ■

Dr. Anna Mae Walsh Burke is the founding director of the Institute for Law and Computers at Nova University, where she has also served as director of the Center for Science and Engineering. She has been an educator, author, and programmer for more than 20 years, and has written four books in the area of computer literacy. Write to her at 2409 N.E. 37th Street, Fort Lauderdale, FL 33308.



SuperPILOT: *Between* Student and Teacher



Give an Apple back to your students. With SuperPILOT, you can create interactive tutorials they'll learn from and enjoy.

by Linda J. Pattison

You want to design and implement interactive CAI (computer assisted instruction) tutorials that will challenge and stimulate your students. But you don't have the time in an already crowded schedule to create programs in conventional languages like BASIC, COBOL, Pascal, or FORTRAN.

Or you may have even less than a nodding acquaintance with BASIC. But you can imagine using the Apple's graphic and sound capabilities to capture and then sustain your students' interest and attention as well as to reinforce their learning.

In either case, for your purposes, authoring systems and languages can provide an alternative to conventional programming, as well as to commercial software. And they may be the forerunners of sophisticated tools that will let you design and implement software using commands no more complex than those needed to move a mouse or do a little dictating.

Most authoring procedures involve PILOT (Programmed Inquiry, Learning, or Teaching) a language developed in the early 1970s. PILOT then had about eight primary instructions and was intended for instructors who wanted to develop teaching programs after a short time learning the language. Common PILOT was developed at Western Washington University and is much more complex and versatile; some versions provide options as rich as BASIC or Pascal. In addition, with PILOT, instructors can easily incorporate graphics and sound effects into their lessons.

The SuperPilot Standard

Apple's SuperPILOT, in particular, has set a standard for other authoring languages. Compatible with the II, II Plus, //e, and //c, and based on Pascal, SuperPILOT comprises commands you can use in either simple or complex patterns to create interactive sequences as varied as your own ex-

Having used the SuperPILOT package for two years with her students, Linda J. Pattison now trains other teachers in the uses of this authoring language. You can write to her at P.O. Box 142, Waverley, Nova Scotia, Canada, B0N 2S0.

Table 1. A sampler of SuperPILOT's commands.

Command	Description
g:es	Graphics command: erase screen.
t:	Display this text.
ty:	Display this if the answer matches.
tn:	Display this if the answer doesn't match.
ts:s2	Typeset, double-size text.
as:	Accept-simple; wait for student here.
a:	Accept student answer here.
ax:	Accept answer exactly; do not edit.
m:	Match student answers with these words, numbers, or symbols.
mj:	Match an answer and jump here.
j:	Jump to a location named here.
j:@a	Take cursor back for another try.
k:	Keep the student's answer.
ks:	Keep the answer, then store it in record-keeper.
g:	Display these screen positions.
gx:	Display a graphic stored in the "etch-a-sketch" editor.
s:	Play these notes.
sx:	Play a sound effect stored in the sound editor.
tx:	Display a character set designed in that editor.

perience and creativity allow.

You need two disk drives to create materials but your students will need only one drive to run your programs. Store student responses and test results on the lesson disk itself or on a separate record-keeping disk. A System.Log file automatically stores such results if you issue a k: command (see **Table 1**) while creating the lesson. Detailed color graphics, sound effects, and simple animation of author-designed character sets or of ASCII symbols—all are possible with SuperPILOT.

With SuperPILOT you can combine lesson materials with videotape and display them on a color monitor. Also

available in this language are the relative turtle graphics routines now familiar to many Logo users. Provisions exist for promoting extensive student control and choice of information available on any of your disks, a feature which extends the authoring language far beyond the range of simple authoring systems. While all of this may sound complex to the aspiring software author, the novice can start with the simple commands available in earlier versions of PILOT and progress to a comfortable level of complexity based on personal needs, talents, goals, and available time.

Stephen M. Weissmann (see *inCider*, September 1983, p. 54) has estimated that you could create a program normally taking 200 design hours in BASIC in about 20 hours with SuperPILOT. This figure would naturally vary from programmer to programmer, but the significant gain in time it indicates should attract the attention of most already-overburdened software authors. My experience has shown that interested educators, already discouraged by conventional programming, see new opportunities to become proficient in authoring languages.

SuperPILOT Editors and Utilities

To start SuperPILOT you place an Author disk in Drive 1 and a blank disk in Drive 2. Turn the computer on and you will hear the clickety-clackety sound of the disks booting and see the lights on both drives light up as SuperPILOT instructs the computer about its status. A Menu screen lists the four editors and two utilities described in **Table 2**. Use the Initialization Utility first to prepare your blank disk for SuperPILOT.

SuperPILOT Programming

In SuperPILOT you control the t: command in the left margin of the Lesson Text Editor as you would enter regular text in a word processing program like Applewriter. The Editor never breaks words between lines of text but moves them to the next line, and you use the carriage return only if approaching a total of 255 character positions, or if you prefer a particular spacing of text. Upper- and lowercase

letters are available when you use the shift key like a typewriter's. If your students are using one of the older II computer series, ensure that a shift key modification has been made to the machine if you want them to enter answers in lowercase.

The command `ts: s2;t2:f5` (**Listing 1**) prints bold, double-size text in orange. Because you don't have to number lines you can state the details of the lesson without worrying about inserting future commands between sequentially numbered program lines as you would in BASIC. By adding the command `as:` you can tell the program to wait until the student has read the text on the screen—a simple provision to allow for different reading speeds and greater student control of the lesson's progress.

You can edit student-answer options in many different ways. The command `a:` accepts the student's answer, and the commands `m:` and `mj:` match the student's answer with other words in memory. If an exact answer with upper- and lowercase letters is essential, you may consider the procedure delineated in **Listing 2**.

The student gets three tries as the `t1:` `t2:` `t3:` sequence indicates, but is also coached if he or she uses any of several commonly encountered errors you've anticipated. In this case, the errors might be: H., Hg, Hy, or h.

Student Responses: Possible Scenarios

Here's what might happen when the student runs the program:

What is the atomic symbol for Hydrogen?

Hyd

No, please try again.

I don't know.

Hint: It is one letter, uppercase.

Maybe it's H, then.

Right. H is the atomic symbol for Hydrogen. Please press Return to continue.

Or, the answering sequence might proceed this way:

What is the atomic symbol for hydrogen?

hy

The symbol for Hydrogen has only one letter. Please try again.

h

Please use an uppercase letter. Type your answer again.

H

Right. H is the atomic symbol for Hydrogen. Please press Return to continue.

Here is another example of a "three-tries" format. The program asks students to identify a Canadian province by its shape. When the student answers incorrectly, the program responds, "No, please try again." On the second incorrect answer, the student is given a hint, in this case: "The capital of this province is Halifax. Please try again." If the student is still incorrect on the third try, the program gives the answer and proceeds to the next question. Meanwhile, the program totals the student's correct answers (`c: t=t+1`), and displays the sum at the end of the questions. My students ask for this disk frequently and try to get all the answers the first time through the program.

Creating this program is easy because you need not anticipate incorrect answers. When my husband and I offered an evening course for computer novices—all Social Studies teachers—we used the set of commands in **Listing 3** for teachers beginning their first lesson. The `gx:` command displays an outline of the province of Nova Scotia (see **Photo**).

The following could result as student answers to this sequence:

What province is represented by this shape?

Ontario

No, please try again.

Quebec

I'm afraid not. (Hint: The capital of this province is Halifax.)

Please try again.

Nova Scotia

Yes, this shape represents Nova Scotia.

Please touch Return to continue.

By the time these teachers had created a few frames they began to see a need to allow both for hint sequences, such as the `t1:` `t2:` `t3:` commands in the Provinces program, as well as for a sequence to respond to typical errors. Here, their teaching experience was challenged as they recalled the kinds of incorrect answers students had given to certain questions in the past. Here, too, they began to explore the `m:` (`match`) command, the heart of PILOT—a topic worthy of a separate article or book chapter. The Language Reference Manual accompanying SuperPILOT doesn't do this command justice; perhaps those experienced in PILOT authoring will share their creative applications of the `m:` command in articles, books, and other references.

More Programming

Listing 4 doesn't require editing of

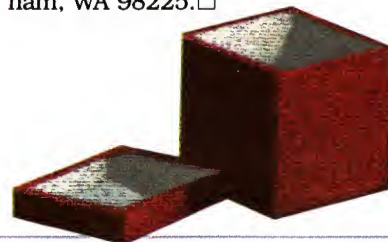
CoPILOTing with User Groups

Versions of Common PILOT are available for the Apple II series of computers, for the Commodore 64, the IBM/PC, the Monroe EC8800, the TI 99/4, the BBC/Acorn, and will presumably appear for all personal computers. But beware: not all forms of Common PILOT offer the same features, nor are they totally compatible on different machines. Most offer little more than the original commands available ten years ago, but a few offer astounding options to student and teacher.

The Common Pilot User's Group (CPUG) helps users understand new developments in PILOT and swap information through a shared membership list.

Recently, CPUG circulated the information you'd need for the videotape modification to SuperPILOT—supplementing the Apple manual, which included only the documentation for videodisk at the time of publication.

For an unbiased account of PILOT features contact Larry Kheriaty, Common Pilot Users Group, Computer Center, Western Washington University, Bellingham, WA 98225. □



upper- and lowercase letters so the a: command is adequate. A student may not know the correct answer but might type a reasonable answer like "baleen whale" or "sperm whale." The program is designed so that the student gets reinforcement for this answer and on a second incorrect try is coached with a hint. The answering might proceed as follows:

Name the largest whale found in the planet's oceans today.
I think it might be the sperm whale!

A sperm whale is very large, but there is a bigger one! Please try again.
I can't think of it!
Hint: This whale is named after a color.
Oh—it must be the blue whale.
Yes, the blue whale is actually the largest creature on Earth. It may be as long as three railway box cars!

Professor Anthony Barton of Dalhousie University, Halifax, recommended this kind of response sequence to me because it allows the author to respond to the student in two

important ways: the t1: t2: t3: coaching sequence for unanticipated student answers, and the mj: mj: mj: sequence for typical incorrect answers for students.

The primary strength of this type of programming is the degree of individual response for incorrect answers it allows. You can give detailed hints and explanations without worrying about editing text to fit on the screen when the program runs, and you don't have to number the lines. You can easily print

Listing 1. Introductory screen display for a tutorial on the periodic table.

```
*1
g:es
ts:s2;t2;f5
t:      30 Elements
ts:s1;t1;f3
t:We will study 30 elements in the
  Periodic Chart of the Elements, beginning
  with Hydrogen, atomic number 1. H is the
  atomic symbol for Hydrogen.
t:
t:As a matter of fact, all elements have
  very short atomic symbols, never more than
  2 letters. The first letter is always in
  uppercase, and if there is a second letter,
  it is written in lowercase.
t:
t:Examples-
t:
t:Hydrogen-H
t: Helium-He
t:
t:Please press the RETURN key to continue.
as:
```

Listing 2. This series anticipates possible incorrect answers to the question "What is the atomic symbol for Hydrogen?" and hints at the appropriate response.

```
t:What is the atomic symbol for Hydrogen?
ax:
mj:H.
t:Please leave out the period. Type your
  answer again.
j:@a
mj:He
t:No, He is the symbol for Helium. Please
  try again.
j:@a
mj:Hg
t:No, Hg is the symbol for Mercury. Try again.
j:@a
mj:Hy!hy!hY!HY
t:The symbol for Hydrogen has only one letter.
  Try again.
j:@a
mj:h
t:Please use an uppercase letter. Type your
  answer again.
j:@a
m:H
ty:Right. H is the atomic symbol for Hydrogen.
jy:ret
t1:No, please try again.
t2:Hint: It is one letter, uppercase.
t3:No, H is the symbol for Hydrogen
j3:ret
jn:@a
*ret
t:Please press RETURN to continue.
as:
```

Listing 3. Combine text and graphics using this sequence in SuperPILOT.

```
*1
g:es
gx:NOVASCOTIA
t:
t:What province is represented by this shape?
a:$n$
m:novascotia!ns!n.s.
ty:Yes, this shape represents Nova Scotia.
cy:t=t+1
jy:lc
t1:No, please try again.
t2:I'm afraid not. (Hint: The capital of this
  province is Halifax.)
t3:No, this province is Nova Scotia.
j3:lc
jn:@a
*lc
t:Please touch RETURN to continue.
as:
*2
```

Listing 4. A streamlined form of programming with SuperPILOT that lets you anticipate many predictable, but incorrect, answers.

```
t:Name the largest whale found in the planet's
  oceans today.
a:
mj:sperm
t:A sperm whale is very large, but there is a
  bigger one! Please try again.
j:@a
mj:baleen!killer!harbour!right
t:These are whales, but there is one much
  larger!
j:@a
mj:porpoise!dolphin!narwhal!pilot
t:These animals are related to whales, but what
  is the biggest whale?
j:@a
m:blue!bluewhale
ty:Yes, the blue whale is actually the largest
  creature on earth. It may be as long as three
  railway cars!
jy:lc
t1:No, please try again.
t2:Hint: this whale is named after a color.
t3:No, the largest whale is the blue whale. A
  fully grown adult can be as long as three
  railway box cars!
j3:lc
jn:@a
*lc
t:Please press the RETURN key for another
  question.
as:
```

out tests, student answers, scores, or the program itself. If you have a graphics interface or a serial printer like Silentype or Imagewriter you can easily get copies of graphics and reproduce them on a spirit-duplicating stencil for classroom use.

By testing your lessons on student target groups you can accumulate responses for the majority of errors the target group could be expected to make while learning the CAI material. By adding the simple k: command and the System.Log, you can store all student responses during program-testing for future lesson improvements. (A complementary software package, SuperPILOT Log, analyzes student data in System.Log files.)

Students can also make detailed comments to their instructors and have these comments stored on the lesson disks in the System.Log file; implicit in this suggestion is the philosophy that students ought to exert some control over their CAI, and that instructors should be willing to alter programs periodically to suit their students' needs.

A Testimonial

After using SuperPILOT tutorials for one school year with my eighth grade students I've noticed that they often return to certain programs. One is the disk using Canadian provincial graphics which my husband designed for his Social Studies students—a drill and practice sequence in which students see an outline of a Canadian province and must name it. They also request the Chemistry program mentioned earlier, and will try the lessons first but return most frequently to the quizzes on the symbols and their spellings, trying to improve their scores time after time.

In our school, students use this and other educational software during their free time. We have only three computers for six hundred students and the machines are running all day. I would like to emphasize that our students are given complete freedom over their choice of software, partly because the frequency of their choices will tell us which pieces of software have been successful. Knowing this will assist us in purchasing commercial software as well as in the design of SuperPILOT tutorials. As the teachers in our school systems create more tutorials, their students will have access to a substantial software library which they can access privately to enhance their learning.



Photo. In the interactive tutorials you create with SuperPILOT, students get more than one chance at a correct answer.

Table 2. SuperPILOT's Editors and Utilities.

Editor/Utility	Command	Description
Lesson Text Editor	L	The heart of SuperPilot with the sophisticated features of a high-level word processor
Character Set Editor	C	Uses ASCII or custom character sets and animates the latter in concert with the lesson text editor
Graphics Editor	G	An "etch-a-sketch" that lets you create high-resolution images through a compass-rose key arrangement: I(up), M(down), J(left), K(right) and surrounding keys; initiates change with a single keystroke (You can also create hi-res lines with simple turtle graphics initiated by a g: command in the lesson text editor.)
Sound Editor	S	Lets you include your own creations or mimic others' work (You can also generate sound in a lesson by a direct s: command.)
Disk Copy Utility	D	Creates back-ups or extra copies of all or part of a disk quickly through simple screen directions
Disk Initialization	I	Initializes blank disk in Drive 2 without complicated codes

A Caveat

Authoring software in SuperPILOT, as in any other computer language, isn't without dangers. Many teachers who have stated their concern over the proliferation of poor educational software see authoring systems and languages as a greater threat because they are easier to access. Teacher education institutions are sensitive to this dilemma and are trying to show teachers the known qualities of good software while sharing the features of the technology. Timothy Jay (*Educational Technology*, January 1983) has summarized much of what we now know about creating software in a fine article which potential software authors should consult, regardless of the computer language they're using.

When field-testing your tutorials you'll undoubtedly find that your stu-

dents are your best and most constructive critics. Without hesitation they'll tell you which explanations are not up to scratch, and which questions confuse them. Even if you decide that you don't want to continue creating your own software, you will have acquired additional skills that can improve the quality of your classroom instruction. Further, you are likely to evaluate commercial software from a new perspective and understand the needs of your students a little better if you are asked to participate in software purchases for your school.

The tutorial mode of SuperPILOT is one aspect of computer-enhanced instruction that complements other educational software, while supplementing the personal interaction that is the hallmark of a good teacher. ■

Populist Computing



Columbus, Ohio—urban, multiracial, a university city, and site of a yearly onslaught against computer illiteracy in the community: Summer Tech.

Co-sponsored by Ohio State University and the Columbus public school system, the Summer Tech program has also been funded by donations from business and industry and a grant from the state of Ohio. Notable among the business contributions has been over \$50,000 worth of hardware and software from RMS Sales, Inc., Ohio's Apple distributor.

Summer Tech attracted over 8000 registrants both in 1983, and in 1984. Its population represents widely diverse backgrounds and experi-

ence from 12-year-old whiz kids to 80-year-old homemakers to businesspeople and other professionals.

The minimal fee—\$25 per course—promotes one of the program's major objectives: to provide inexpensive training in computer-related skills, particularly for the unemployed. The program's developers recognized that the many successful computer literacy programs already launched by private and suburban school systems hadn't addressed the needs of this segment of the population.

Another goal of Summer Tech has been to help establish the central Ohio area as an important high-tech center. In the words of a letter launching one of the supporting fund drives, the pub-

lic school system and the university hoped to create a "national prototype for rapidly familiarizing an entire community with computers."

Picking Apples

The Apple II was the computer of choice for Summer Tech because project developers wanted durable hardware and accompanying software that was easy to understand and use. And they wanted a system that wouldn't get obsolete and could be expanded.

Through an arrangement called Apple Buy, 560 Apple computers were purchased at discount. During the academic year, Columbus public school children use the same comput-



Summer Tech demystifies computer technology through hands-on Apple training for an entire community.

ers in their classes.

Software used in the project ranges from the Apple Presents Apple familiarization routine to Apple Logo PFS:File and Report, Applewriter IIe, Quick-File, Bank Street Writer, State of the Art General Ledger, Appleworks, and VisiCalc.

Both certified instructors and professionals from various fields who have computer expertise to share form the Summer Tech faculty.

Range of Courses

Course offerings have included Computers for Kids; Introduction to Microcomputers; Programming in BASIC, Logo, Pascal, and Assembly Language; Word Processing; Spread-

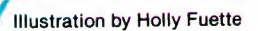
sheets; Data Base Management; Problem-Solving; Artificial Intelligence; CAD/CAM; and Robotics. Most topics are addressed in two ten-hour courses of instruction that a student can complete in a couple of weeks if he or she attends for two hours daily. Supervised practice periods outside regular classroom time offer supplementary training for those who want to pursue their new-found interests that much further.

At the end of a course participants receive certificates of completion. In turn, they rate the program on course content and quality of instruction. These surveys have produced mostly positive, constructive, even humorous responses ranging from "How

about selling Summer Tech t-shirts?" to "I am 70 years of age and I gained a healthy respect for computer tech. My grandchildren are trying next week."

Columbus already has plans for Summer Tech '85. If you're interested in launching such a program in your own community, contact Laura Ecklar, Public Information Officer, Columbus Public Schools, 270 East State Street, Columbus, OH 43215; (614) 225-2860. She'll be glad to pass along all the helpful advice she can. ■


Editor's Note: Mike Brewer, a professional photographer and 1983 Summer Tech instructor, provided the photographs and much of the information for this story. —S.G.





Instant Alphabet

Just add Logo!

ne irritating part of programming in Logo is spending hours making a picture with the turtle graphics and then having someone else come along and ask, "What can you do with it?" or, "Is that all Logo does?" While creating a picture or design with Logo is satisfying in itself, it is also nice to put the programming project to other uses.

Instant Alphabet combines both the list processing and turtle graphics parts of Logo. The result is a set of electronic flash cards for young children. Because the procedures are run by single keystrokes, very young children can use the computer in a meaningful interactive manner. Zachary, at age 20 months, was able to use the program and control the computer almost by himself.

Logo was developed as both a programming language and an educational philosophy. Instant Alphabet is a microworld that enables a very young child to explore with the symbols that are the basis of our language.

While Zachary doesn't know the alphabet, he is learning to associate the letters on the keyboard with what is happening on the screen. Logo helps to put him in control of his own learning within the limits established by his parents. The microworld of the alphabet is fun for him to play in, and yet important because it will connect other learning experiences useful in the future.

Instant Alphabet is also an excellent family project. Parents or older children can do the programming and younger children can enjoy the results. In this way, the created pictures are tailored to the experience of the young user. (The same thing can happen at school. Older students write the procedures to make the letters and pictures, while younger students use them. Since at least 26 pictures need to be created, a whole class could be involved in the project.)

To get started, you need procedures that will recognize when a key has been pressed, load the appropriate file from the disk, and then run the procedures. For example, when the letter H has been pressed, the file H should be loaded, and the procedure H

by Wayne T. Blanchard

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should be run. As a result, the turtle will then draw the letter H on the screen with a picture of a house next to it. (The controlling procedures were debugged, revised, and simplified with help from members of the Monadnock Area Logo Users Group of New Hampshire.)

Type the following three procedures (INFO, INSTANT.ALPHA and RUN-LETTER) into an empty workspace. Do not try to run the procedures until you save them using the instructions below.

```
TO INFO
  CLEARTEXT
  SETCURSOR [5 10]
  PRINT [WELCOME TO THE INSTANT
    ALPHABET!]
  PRINT ""
  PRINT ""
  ERASE "INFO
  RUN [INSTANT.ALPHA]
END
```

The INFO procedure will be set up to load automatically. It clears the screen and prints the welcome message in the middle. To save space, INFO then erases itself. Finally, it calls the procedure INSTANT.ALPHA. The RUN command takes a list as input and runs it as if it were typed in directly from the top level.

```
TO INSTANT.ALPHA
  ERALL
  PRINT [TO GO: PUSH ANY KEY WITH A
    LETTER ON IT]
  PRINT [TO STOP: TYPE <CTRL> "G"]
  MAKE "LETTER READCHAR
  RUNLETTER
  INSTANT.ALPHA
END
```

INSTANT.ALPHA is a recursive procedure that is the heart of the program. It first erases all the procedures from the workspace. Next, it prints two instruction lines. The MAKE statement causes the variable :LETTER to take on the value of whatever key is pressed. The procedure RUNLETTER is then called. Finally, INSTANT.ALPHA calls a new version of itself.

TO RUNLETTER

```
CLEARTEXT
PRINT (SENTENCE [THE LETTER]
  :LETTER [IS COMING NEXT!])
LOAD :LETTER
RUN (LIST :LETTER)
END
```

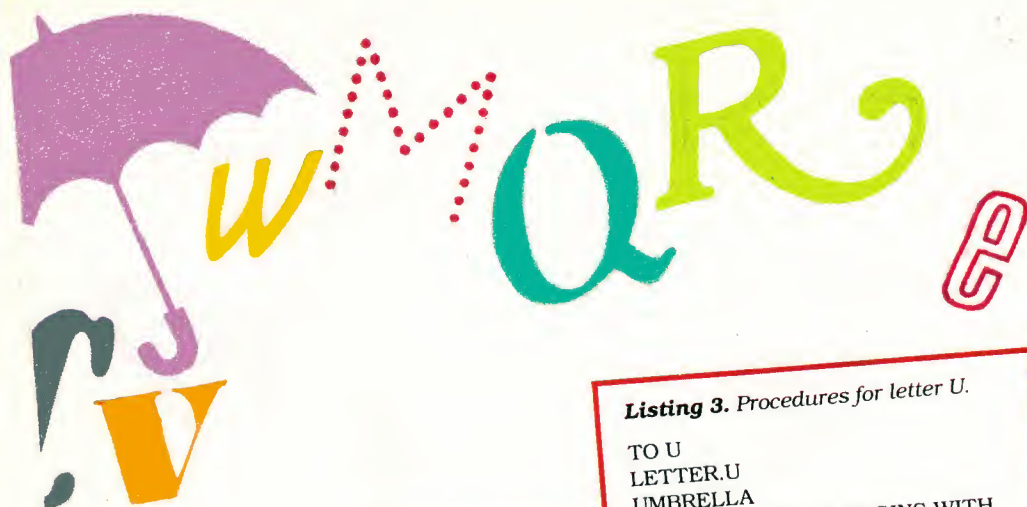
The RUNLETTER procedure clears the screen. It then prints a message on the screen indicating which letter will appear on the screen next. Remember, the value of the variable :LETTER is the key that is pressed. The procedure then loads the procedures that will make the letter and its accompanying picture. Each letter of the alphabet must have its own file and be named with a single letter, not a word. Finally, RUNLETTER runs the procedures that were just loaded. Again, the procedure name must be the same as the file name—a letter of the alphabet. Now type the following line:

```
MAKE "STARTUP [IF NOT KEYP [INFO]]
```

STARTUP is defined as follows in the *Apple Logo Tool Kit*. "STARTUP is a special name in Apple Logo. If its value is list, that list is taken to be a list of instructions that is run when the file containing the name STARTUP is LOADED." In other words, the procedure INFO will automatically run when the file is loaded. The phrase, IF NOT KEYP, allows the user to override this automatic feature. By pressing return an extra time just after the LOAD command, the program will load but the procedure will not run. You may then examine and edit the procedure. Type RUN: STARTUP to start the program.

Listing 1. Procedures for letter S.

```
TO S
  LETTERS
  SUN
  PRINT [SUNSHINE STARTS WITH THE
    LETTER S]
  END
  TO LETTERS
    CLEARSCREEN CLEARTEXT
    HIDE TURTLE
    SETBG 5 SETPC 0
    PENUP
    LEFT 90 FORWARD 50 RIGHT 90
    FORWARD 75
    PENDOWN
    ARCLEFT 25 270 ARCRIGHT 25 270
    PENUP
    RIGHT 90 FORWARD 150
    PENDOWN
    END
    TO SUN
      HIDE TURTLE
      SETPC 4
      POLYSPIRAL 26 170 2
      END
      TO POLYSPIRAL :SIDE :ANGLE :INC
        IF :SIDE = 150 [STOP]
        POLYSTEP :SIDE :ANGLE
        POLYSPIRAL (:SIDE + :INC) :ANGLE
        :INC
      END
      TO POLYSTEP :SIDE :ANGLE
        FORWARD :SIDE
        RIGHT :ANGLE
      END
```



Listing 2. Procedures for letter T.

```

TO T
LETTER.T
TREE
PRINT [TREE STARTS WITH A T]
END

TO LETTER.T
CLEARTEXT CLEARSCREEN
HIDETURTLE
SETBG 0 SETPC 2
PENUP LEFT 90 FORWARD 75
PENDOWN
RIGHT 90 FORWARD 100 LEFT 90
FORWARD 25 BACK 50
FORWARD 25 RIGHT 90 BACK 100
PENUP
RIGHT 60 FORWARD 150 SETH 0
PENDOWN
END

TO TREE
RIGHT 150
BRANCH 110
SETH 0
BACK 125
LEFT 90
PENUP FORWARD 2 RIGHT 90
PENDOWN
BAR 2 30
END

TO BRANCH :SIZE
IF :SIZE < 10 [STOP]
TRIANGLE :SIZE
BRANCH :SIZE - 10
END

TO TRIANGLE :SIZE
FORWARD :SIZE
RIGHT 120
FORWARD :SIZE
RIGHT 120
FORWARD :SIZE
RIGHT 120
END

TO BAR :HOW.MANY :LENGTH
REPEAT :HOW.MANY [FORWARD
:LENGTH RIGHT 90 FORWARD 1
RIGHT 90 FORWARD :LENGTH
LEFT 90 FORWARD 1 LEFT 90]
END

```

Listing 3. Procedures for letter U.

```

TO U
LETTER.U
UMBRELLA
PRINT [UMBRELLA BEGINS WITH
THE LETTER U]

TO LETTER.U
CLEARSCREEN CLEARTEXT
HIDETURTLE
SETBG 2 SETPC 0
PENUP LEFT 45 FORWARD 135
PENDOWN LEFT 135 FORWARD 75
ARCLEFT 25 180 FORWARD 75
PENUP HOME PENDOWN
END

TO UMBRELLA
UMBRELLA.PART
MOVE1
RAIN
END

TO UMBRELLA.PART
REPEAT 5 [ARCRIGHT 10 180 RIGHT
180]
ARCLEFT 50 180
PENUP
LEFT 90 FORWARD 50 RIGHT 90
PENDOWN
FORWARD 50
ARCLEFT 10 180
END

TO MOVE1
PENUP
FORWARD 160
LEFT 90
FORWARD 80
LEFT 90
PENDOWN
END

TO RAIN
REPEAT 15 [FORWARD 5 PENUP
FORWARD 5 PENDOWN FORWARD
5 PENUP FORWARD 5 PENDOWN
FORWARD 5 PENUP FORWARD 5
PENDOWN FORWARD 5 MOVE2]
END

TO MOVE2
PENUP
LEFT 90
FORWARD 10
RIGHT 90
BACK 30
PENDOWN
END

```

The next step is to type PKGALL "ALPHA.CONTROL. This command puts everything in the workspace (the three procedures and the variable :STARTUP) into a package called ALPHA.CONTROL. Now, put the package into the buried workspace by typing BURY "ALPHA.CONTROL. The above procedures control the action, so we do not want them to be erased. Placing them in the buried workspace prevents erasure and makes them invisible to the user. Now, the buried workspace must be saved. Type SAVE "ALPHABET "ALPHA.CONTROL. This command takes the buried package called ALPHA.CONTROL and saves it in the file named ALPHABET. At this point, we are finally ready to create the procedures and a file for each letter of the alphabet.

The procedures for the letters S, T, and U in Listings 1, 2, and 3 should help you begin. We'll start with the letter S. After you have typed the Listing 1 procedures, type SAVE "S. Then type ERALL to clear the workspace.

Now go to the Listing 2 procedure to make the letter T and a tree. Again, after you type the procedures, type SAVE "T and press return. Then type ERALL to erase the workspace.

You are then ready for the next letter. Listing 3 is one way to do the letter U. Save what you have done by typing SAVE "U and pressing return. Type ERALL and you are ready to begin making letters on your own. Remember, the name of each file and name of the controlling procedure should be the same single letter. Also remember that in order for ARCLLEFT and ARCRIGHT procedures to work in the letters S and U, you must load the Apple Logo stack file.

Instant Alphabet puts pictures created with turtle graphics to work. Making the procedures can be put into a group or a family activity. INSTANT.ALPHA and RUNLET procedures simply provide a way to put them together. The two procedures enable you to overcome the workspace memory limitations by moving the picture procedures from the workspace to the file.

In the process of creating letters and pictures, you will have fun learning about Logo. The end result will be an alphabet microworld for a young computer user. Both the process and the product are important parts of a learning environment. ■

GUIDE TO COLLEGE BOARD SOFTWARE

by Bob Ryan and Joan Witham, inCider staff

Armed with only a sheaf of freshly sharpened number 2 pencils, most high school juniors face their first SAT exam with dread. Though inevitable, their fears can be allayed if they enter the examination room with more than an inkling of what's in store for them.

The SAT (Scholastic Aptitude Test) and its cousin, the ACT (American College Testing Program), are given to nearly three million college-bound students every year. College administrators use these standardized tests as one factor in determining whether a particular high schooler would make a good college student. Although in recent years the importance of college boards (as these tests are commonly known) has declined in relation to other admissions criteria, they are still required by over 1700 colleges and universities around the country.

This month, *inCider* provides a guide to the numerous college board preparation programs available for Apple II computers. While these software packages cannot—and don't claim to—substitute for four years of secondary school study, they can be helpful to a student who wants to maximize his or her college board scores.

The best training a college board preparation program can provide is in

"The best training a college board preparation program can provide is in how to take such an examination."

how to take such an examination. There is a definite skill involved in taking the SAT's. Some people are very good test takers, while others, of equal intelligence, don't fare as well. The preparatory programs listed below train a student, among other things, to be a good test taker. They help develop techniques, such as selective guessing, that can make the difference in test results.

These programs can also help students overcome another impediment to good results: anxiety. A person who has spent time working with these programs will feel better prepared to take the tests and will, consequently, do a better job. SAT programs reduce the stress associated with the tests.

Software of this type could also help certain students overcome the built-in cultural bias endemic to most standardized intelligence tests. It is not surprising, then, that the students who as a group fare best on the college boards come from white, middle-class homes. The repeated exposure to SAT-style tests that these programs

provide could be very helpful to students from other cultural and economic backgrounds.

For Apple owners, there is one other advantage that the college board preparation programs offer. For the most part, they are cheaper than the many SAT courses that are offered by private companies. Of course, these courses don't require a \$1300 computer.

Also listed in the guide are programs to help prepare for both the Preliminary Scholastic Aptitude Test (PSAT), a trial exam given to high school juniors and the basis of the National Merit Scholarship competition, and the Graduate Record Exam (GRE). Finally, for good measure, a few good college selection programs have been included in the list. Once you're over the SAT hurdle, these programs can help you decide what schools are right for you. ■

Write to Bob and Joan c/o inCider, 80 Pine St., Peterborough, NH 03458.

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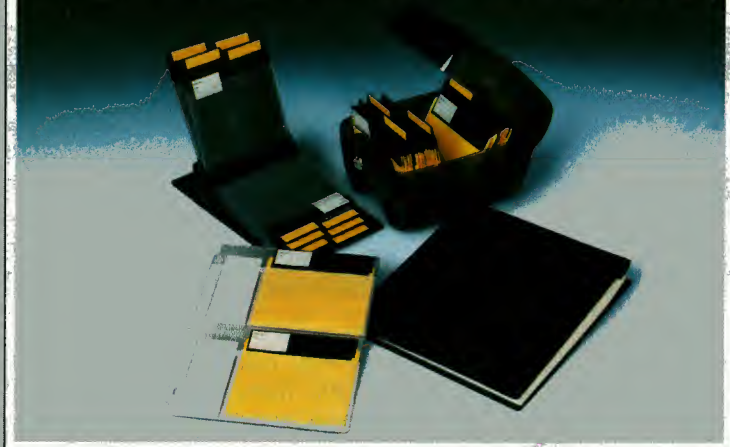
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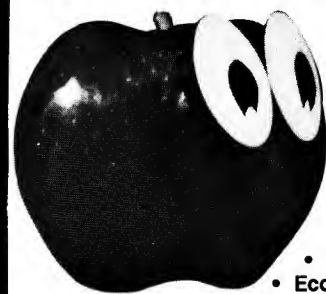
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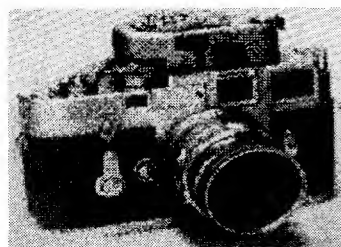
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inCider's inSidious inSolubles

Many of you have sent me kind letters expressing your likes and dislikes with the inSolubles page. I have tried to respond to all submissions, but, unfortunately, I have often been late (or worse) and have let your letters lie unanswered on my cluttered desk. I know, a computer is supposed to organize things, but try as I might, IN BIN>OUT BIN. When you send your entry, please enclose a self-addressed stamped envelope. It will ensure a prompt reply—I promise.

I have received many entries, some duplicates, and my policy is this: Acceptable entries are published in approximately the order in which they are received. Duplicate entries are both awarded a free subscription if they arrive at about the same time. If you submit an entry without a SASE and hear nothing from me, your entry is probably under consideration and may be used at a later time.

An inSoluble is: a puzzle, a perplexity, an enigma; a queasy feeling in the pit of the stomach; a program that works right—some of the time; a routine that looks right, but isn't. It's easy or hard or tricky or cute. And, if it were not for the possible reward of a free subscription to *inCider*, it's something you'd rather not have to contend with.

Send in an inSidious inSoluble program to challenge other readers. The rules are:

1. An inSoluble must be an Apple-soft BASIC program. Any poked machine language subroutines and calls to that subroutine must be correct.

2. The program must accomplish something. In other words, when it's run it should yield some kind of result.

Write to Art Ude c/o inCider, 80 Pine Street, Peterborough, NH 03458.

3. The program should not generate an error message of any kind, except in case of a typing error, and it shouldn't crash.

4. There must be a short explanation of what the program is supposed to do. The explanation may contain clues to the problem.

5. The program may make use of common peripherals such as disk, printer, and modem.

6. The program may have more than one error.

7. You must provide the solution with the problem.

The shorter the inSoluble, the better—but we like programs that do something useful.

The Factorial

Bob Rinehart of Bala Cynwyd, Pennsylvania, tells us that a factorial is the result of multiplying together a series of numbers starting at 1. For example, 3! (read "3 factorial") is $3 \times 2 \times 1 = 6$, while $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$. The Factorial, our first inSoluble this month, may, at first glance, seem to compute—but it doesn't. This one is easy.

Listing 1. The Factorial.

```
10 TEXT : HOME
20 INPUT "ENTER A NUMBER: ";NUM
30 PRINT
40 FOR I = 1 TO NUM
50 FACT = FACT * I
60 NEXT I
70 PRINT NUM;"! = ";FACT
```

Messy Input

Walter Allen of Montreal, Quebec, wanted to stop all those messy ?RE-ENTER errors when someone types a letter during numerical input. Should be easy—no problem! Right? Walter uses an ONERR GOTO command to trap incorrect input, and the selection of an Applesoft volume number to test his ideas.

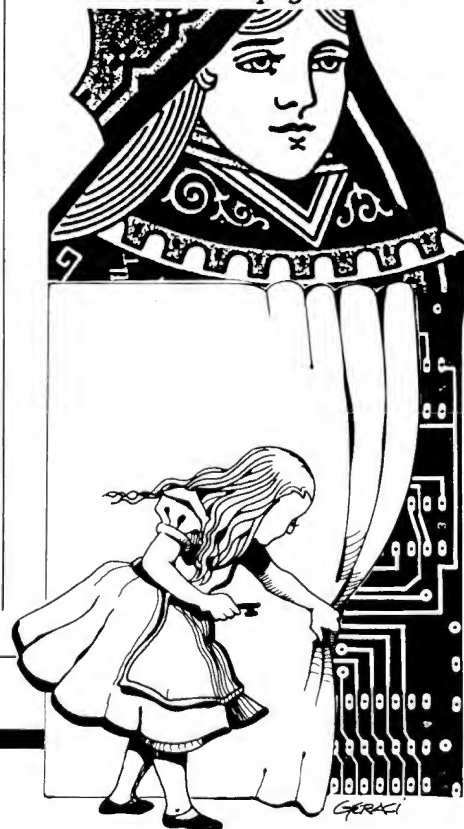
Walter asks if using an ONERR in an inSoluble is okay. Hey, Walt, most things are okay if they can be typed from a keyboard. The POKE 216,0 clears the error flag, in case you're wondering. Remember, when typing this one, called Messy Input, be extremely careful—the ONERR will also trap your typing errors.

When you think you have it working just great, try answering the INPUT question with "+" or "-", or worse yet, "E", ":", ":", or return. Not as easy as you thought, right? Here's a clue (beware of clues): Where do legal volume numbers start? ■

Listing 2. Messy Input.

```
10 HOME : ONERR GOTO 500
20 VTAB 2: CALL - 958
30 PRINT "TYPE IN A LEGAL VOLUME
   NUMBER ";
40 INPUT V
50 PRINT
60 IF V < 1 OR V > 255 THEN 20
100 PRINT : PRINT "THANKS! VOLUM
   E #";V;" IS OK.": END
500 POKE 216,0: CALL - 198: GOTO
   20
```

Solutions on page 95.



by Art Ude

The harsh but welcome final bell of the school day rings. Kids dash out onto the pavement toward school buses, or toward playing fields, or to club meetings: drama, 4-H, debate, scouts, and now—during the past year at least—to computer clubs.

The Apple Computer Clubs, a program managed by computer educators to help elementary and secondary school students understand computers, is funded by Apple Computer and administered by Computer Publishing Services, Inc., in Lowell, Massachusetts.

Apple contracted with CPS in the spring of 1983 to take charge of the computer clubs project. The membership drive started in December 1983 when The Apple Computer Clubs began promoting the organization.

"Children's sophistication has changed dramatically," says Dick Casabonne, director of the Apple Computer Clubs program. "Computers are becoming second nature" to children, he adds, just as television and radio were to previous generations.

CPS offered computer club kits free to the first 10,000 clubs with at least 12 members on the roster. Kits are now available to clubs for \$25 plus shipping and handling charges. The organizational packages, designed to recruit members, provide clubs with color posters, brochures, an advisor's manual, and a resource guide.

Wheels of the Mind

Originally, the Apple clubs program was the vision of Apple co-founder Steve Jobs, who referred to computers as "wheels of the mind," says Sue Tally, education program development manager for Apple.

"The idea is that we recognize that it's of importance to keep up with what technology has to offer... and schools are unfortunately unable to keep up with this themselves." She adds that in supplementing school activities, clubs continue to prepare students for a computer-oriented society.

The computer clubs branched out of Apple's "Kids Can't Wait" program developed in California last fall. With "Kids Can't Wait," any educational institution in the state received, upon request, one Apple //e starter system

and support materials for each of its academic buildings. Apple gave 10,000 computers to schools during the one-year donation period.

International Appeal

In less than a year, 14,500 clubs formed throughout the world—12,000 in the United States alone. Whether they meet in Hong Kong or in Caspar, Wyoming, Apple computer clubs have spawned in all 50 states and in 25 countries.

"The clubs are pretty evenly distributed in terms of population density," Casabonne says. California leads with 1000 clubs, Houston pulls in 70, and Rhode Island attracts 48. The Midwest has active computer club membership as does the greater Boston area. In Massachusetts, the Andover school system started a computer club in each of its eight elementary schools.

Apple is the leader in the educational field, drawing about 50 percent of the market, according to Casabonne. He notes that Apple is the choice among educators primarily because of its extensive software library.

"A computer is only as good as the software that goes into it," he says.

While education upholds the three R's, Casabonne explains that Apple secures its market share with the three C's: continuity, confidence, and compatibility.

Everyone is a Winner

To keep the momentum going, The Apple Computer Clubs organized a computer competition that culminated in an awards presentation in Washington, DC, May 18-23. Members submitted entries in one of three categories: original programming, applications, and community service. CPS and Apple officials screened more than 700 computer projects for originality, creativity, and effectiveness. Apple brought the finalists to Washington to exhibit their projects. Six were selected as winners, but Tally points out that everyone who participated in the Washington event was a winner.

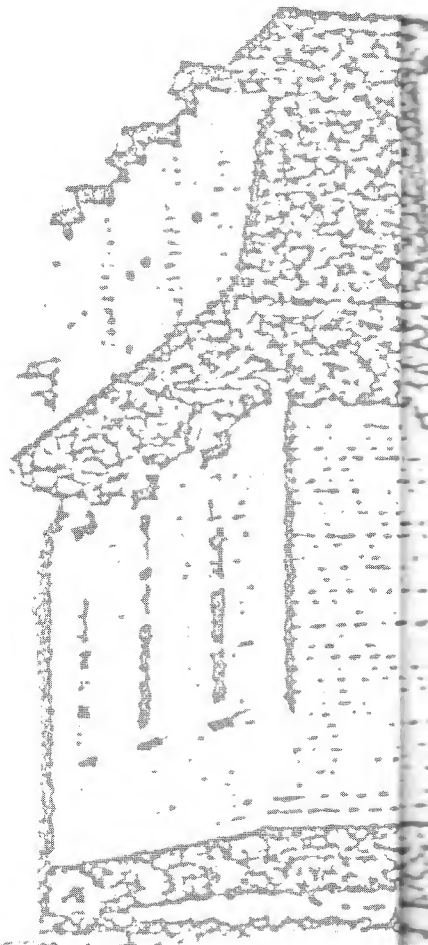
Casabonne agrees. "We didn't want to create a situation where there were winners and losers. We recognize the fact that people win awards for art,

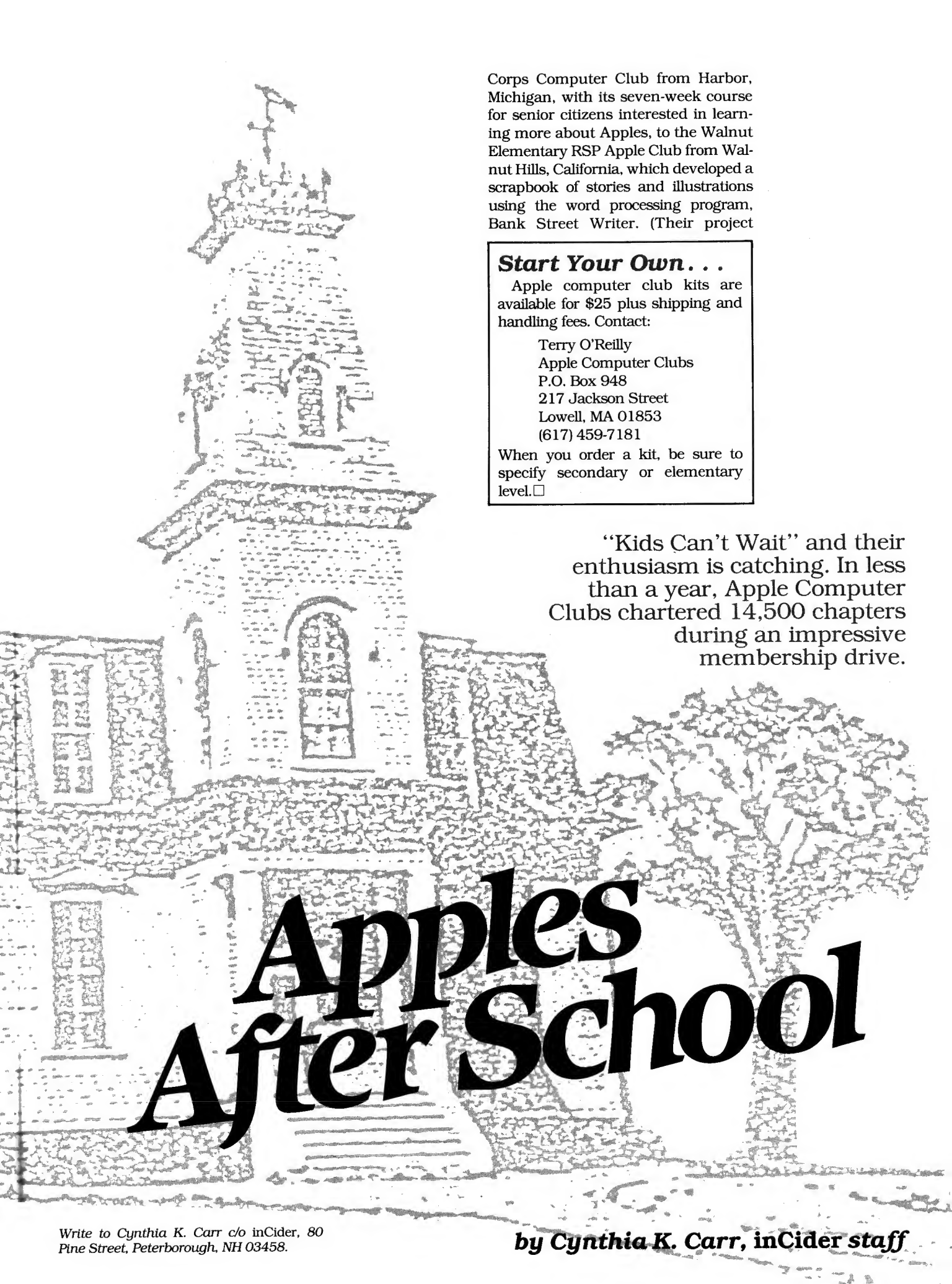
running track...[and the competition served] to recognize teachers', kids', and parents' interest in computers and their enthusiasm about sharing that interest with others. And we are the facilitators—the sounding board for that process—to disseminate information from Apple."

During the awards week, 110 people—finalists, parents, and advisors—presented exhibits, shared experiences, and toured the capital. Apple granted more than \$100,000 in prizes and travel for the extravaganza. The winning clubs in each category received ten Apple //e Starter System packages consisting of an Apple //e with 64K internal memory, a floppy disk with a controller card, a display monitor, and an 80-column card. Runner-up clubs received five Starter System packages. In all, Apple awarded 32 Starter Systems to the winners. Cash prizes of \$1000 and \$500 were given to individual winners and runners-up, respectively.

Enterprising Entries

Entries ranged from the Apple





Corps Computer Club from Harbor, Michigan, with its seven-week course for senior citizens interested in learning more about Apples, to the Walnut Elementary RSP Apple Club from Walnut Hills, California, which developed a scrapbook of stories and illustrations using the word processing program, Bank Street Writer. (Their project

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“Kids Can’t Wait” and their enthusiasm is catching. In less than a year, Apple Computer Clubs chartered 14,500 chapters during an impressive membership drive.

Apples After School

Write to Cynthia K. Carr c/o inCider, 80
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by Cynthia K. Carr, inCider staff

helped these fourth through sixth grade authors, who are learning-disabled students, to communicate better.)

Probably one of the most impressive entries, according to Terry O'Reilly, clubs administrator, was submitted by the Niskayuna Apple Core from Iroquois Middle School in Schenectady, New York. Entitled "Gateway to the World: Albany County Airport," this travellers' aid presentation incorporated all aspects of air travel including circling patterns, runways, flight schedules, international flight-routing, and car rental rates. The program added graphics and music—the theme to television's *The Greatest American Hero* (*Believe It or Not*). An accessible menu was designed to let the traveller

get back to a selected point from any place in the program.

Angela Anthony, the club's advisor, says the nine members started the project right after Christmas break; the travel theme held their interest while providing some educational challenges.

The Niskayuna Apple Core, whose members are between 12 and 14 years old, captured the secondary club division prize. According to Anthony, "The amazing thing about this is that most of them (the students) are self-taught."

Marathon Computing

In Washington, club members didn't spend all their time at an ex-

hibitor's podium. A computer room, complete with the Macintosh and //c, was open in the hotel from 6 a.m. until 10 p.m. Twenty-five software companies made some 75 commercial titles available for the finalists to tinker with in between scheduled events. The computer room was the most popular place with the students. In fact, the room was so popular, one child asked if "he could be excused from the White House tour to play in the computer room instead," Casabonne says.

Response to the first computer club competition was positive and enthusiastic. Next year, officials plan to open the contest to clubs in foreign countries.

"Apple is pleased in that the entries outlined showed all the best things that can happen in education and the community," Tally states.

"Apple's expectations were met," Casabonne notes. "One of the reasons Apple is so excited is that the program just started December 1."

For the most part, all the work put into the projects was done on club time, separate from school requirements. In the classroom, however, applications run the entire gamut from pre-reading skill-builders to word processing packages designed for the college level, Tally says.

After the competition, students completed questionnaires prepared by CPS to find out what they liked or disliked about the competition, and also, how they feel about computers.

In response to "How have computers changed your life?" one student wrote: "Now I use the computer instead of watching TV." Another student commented that he gets A's and B's now when before he brought home C's and D's. "Of course, going to high school helped a lot."

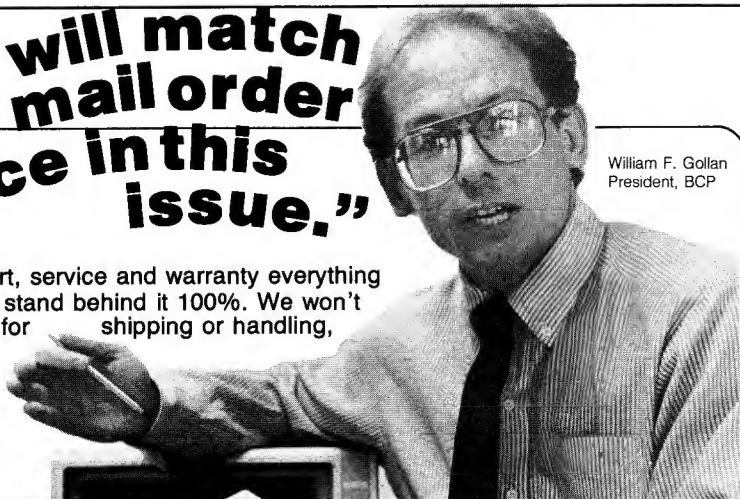
O'Reilly says the questionnaire provides insight into the student's enthusiasm for computers.

"We didn't realize how starved these kids were for information. It became clear they wanted as much time with the machines as they could get and not be distracted from the outside—whether it be for a meal or for homework."

Distractions notwithstanding, students take their programming seriously enough to organize computer clubs—perhaps today's most popular and fastest growing extracurricular activity. ■

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Gameport



Interfacing

by Jerry Faughn

In two previous articles in this magazine I have discussed some simple interfacing experiments that can be done on your Apple. Both of these made use of a 6522 versatile interface adapter (VIA), which provides an avenue for a wide variety of interfacing applications.

However, there is also a large number of interfacing projects that can be done through the gameport of the Apple. The purpose of this article is to discuss the configuration of the gameport and to show how the available pins can be used for input to the computer from the outside world and output from the computer to the outside world.

The gameport is located inside the Apple at the right rear corner of the motherboard, as you face the computer. It is a 16-pin DIP (dual in-line package) connector. Its pin-out arrangement is shown in **Figure 1**. Note that the 5 V pin is located at the right front side of the DIP connector as you

The gameport on your Apple can be used for more than Raster Blaster and its ilk. Try out these simple interfacing experiments to learn about other possibilities.

face the keyboard.

There are three basic types of functions available through the gameport connector. These are indicated by the pins labelled SW, AN, and PDL. In the following sections we will look at some simple interfacing experiments that demonstrate how to access these pins and how to use them.

The Switch Inputs

When you use the joystick trigger in a game to drop a bomb, fire a laser, or

any of a vast variety of other worthwhile pursuits, you are activating a switch input—SW0, SW1, or SW2. As their name implies, these pins detect whether a switch is open or closed. That is, they act as input pins to enable the computer to detect information from the outside world.

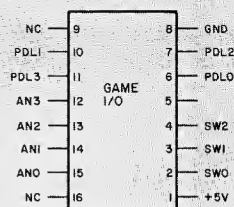
To see how to use these pins, we will concentrate on SW2 as an example. The memory location of this pin is 49521. If a switch is properly connected to this pin,

bit 7 of the memory location is set high when the switch is open and low when the switch is closed. Therefore, when the switch is closed the value returned by PEEKing memory location 49251 will always be less than 128. If the switch is open the value found in memory location 49251 will be greater than 127. This means that you can

Address correspondence to Jerry Faughn at 209 Walnut Hill Road, Richmond, KY 40475.

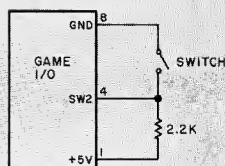


Figure 1. Pin-out diagram of the Apple gameport connector.



“When a particular annunciator pin has been turned on, it is capable of supplying an output current to drive some external device.”

Figure 2. Circuit demonstrating the use of the switch input pins.



Listing 1. Program demonstrating the use of the switch input pins.

```
10 IF PEEK (49251) < 128 THEN GOTO 40
20 PRINT "THE SWITCH IS OPEN"
30 GOTO 50
40 PRINT "THE SWITCH IS CLOSED"
50 FOR I = 1 TO 1000: NEXT I
60 GOTO 10
```

use IF...THEN statements such as the following to detect whether or not a switch connected to this pin is open or closed:

```
IF PEEK (49251)<128 THEN <do something>
IF PEEK (49251)>127 THEN <do something else>
```

As an example of how to use the switch input pins, set up the circuit shown in **Figure 2** and type in the program in **Listing 1**. The circuit and the associated listing should verify that the value returned when 49251 is PEEKed is less than 128 when the switch is closed and greater than 127 when the switch is open.

Note that when making connections to the gameport DIP connector, you should use wire as small in diameter as possible to guard against damaging the connector. Also be sure that the circuit has the 2.2 k ohm protective resistor in place. If not, when you close the switch +5 V will be connected directly to GND. I can guarantee that this condition threatens the health of your Apple's power supply, along with that of several chips on the motherboard.

The Annunciator Output Pins

The switch pins just discussed enable a programmer to direct information into the computer, albeit in a somewhat limited fashion. Output from the computer is achieved through the annunciator pins—ANO, AN1, AN2,

and AN3. These pins are addressed through the following memory locations:

```
ANO OFF (49240)
ANO ON (49241)
AN1 OFF (49242)
AN1 ON (49243)
AN2 OFF (49244)
AN2 ON (49245)
AN3 OFF (49246)
AN3 ON (49247)
```

The annunciator pins are switched on or off by POKing to these memory locations as follows. To turn ANO on—that is, to set it high so it could light an LED (light-emitting diode), activate a relay, or perform a multitude of other tasks—use POKE 49241,0. Likewise, output from ANO can be turned off by POKE 49240,0.

When a particular annunciator pin has been turned on, it has been raised to +5 V and is therefore capable, with suitable connections to it, of supplying an output current to drive some external device. However, the available current from the annunci-

Figure 3. Circuit that will light an LED.

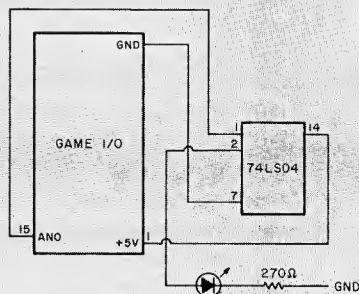
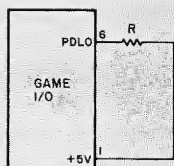


Figure 4. Circuit for the “world's most expensive ohmmeter.”



Listing 2. Program for flashing an LED on and off.

```
10 POKE 49240,0
20 FOR I = 1 TO 500: NEXT I
30 POKE 49241,0
40 FOR I = 1 TO 500: NEXT I
50 GOTO 10
```



ator pins is very small. Therefore, in order to use these pins they must be connected to a so-called line driver, such as the IC 74LS04.

A circuit that will light an LED is shown in **Figure 3**. The output from ANO is fed directly into one of the input pins of the 74LS04. The 74LS04 acts as an amplifier to raise the current to a high enough level to activate the LED. Set up this circuit and then type in the program in **Listing 2**. When you run the program you will find that the LED flashes on and off.

Now, here is something for you to do on your own. Connect the circuits shown in **Figure 2** and **Figure 3** to the Apple at the same time, and write your own program to detect the closure of the switch. When the computer detects that the switch is closed, a branch should make the LED flash on and off.

A little thought reveals that with this circuit you are only a short step from devising a burglar alarm system. The switch closure could be that of a mechanical switch located in a window, or a photocell in a doorway, that closes when someone attempts to break in. The flashing diode could, of course, be replaced by a siren.

As a word of caution, *don't attempt to connect your Apple or other computer to circuits containing 120 V house electricity without a great deal of care, thought, and experience.* At best, a mistake could damage your computer...at worst, it could damage you.

The Paddle Inputs

The paddle inputs are special input ports designed to read the value of a resistance connected to them. In a typical paddle used for game purposes, as you rotate the paddle dial you are changing the value of the resistance fed into the computer from about 0 to 150,000 ohms. The computer converts this resistance input to a value between 0 and 255 that is proportional to the resistance. That is, 0 corresponds to 0 ohms and 255 corresponds to 150,000 ohms.

One way this information can be used in a game is to make a figure move around on the screen. That is, when the input resistance is high because the dial of the paddle is turned in one direction, the program moves the figure, say, to the far right of the screen. When the input resistance is

0, the figure is moved to the extreme left of the screen.

The information read into these ports is accessed by a command of the form $Y = PDL(0)$. This statement looks at the resistance connected to pin PDL0, converts it to a proportional number between 0 and 255, and then sets this number equal to Y.

We will use this information to construct the world's most expensive ohmmeter (a device to measure the value of unknown resistances). To do this, connect a known resistance, say 90,000 ohms, to PDL0 as shown in

Figure 4. When you have your circuit constructed, type in the following program:

```
10 Y1 = PDL(0)
20 PRINT Y1
```

The value of Y1 thus obtained can be used as a calibration factor to determine the resistance of any unknown resistor subsequently connected to PDL0. The unknown resistance can be calculated by a program statement of the form $R = Y * (90000 / Y1)$, where the value determined in the earlier calibration procedure is inserted for Y1. ■

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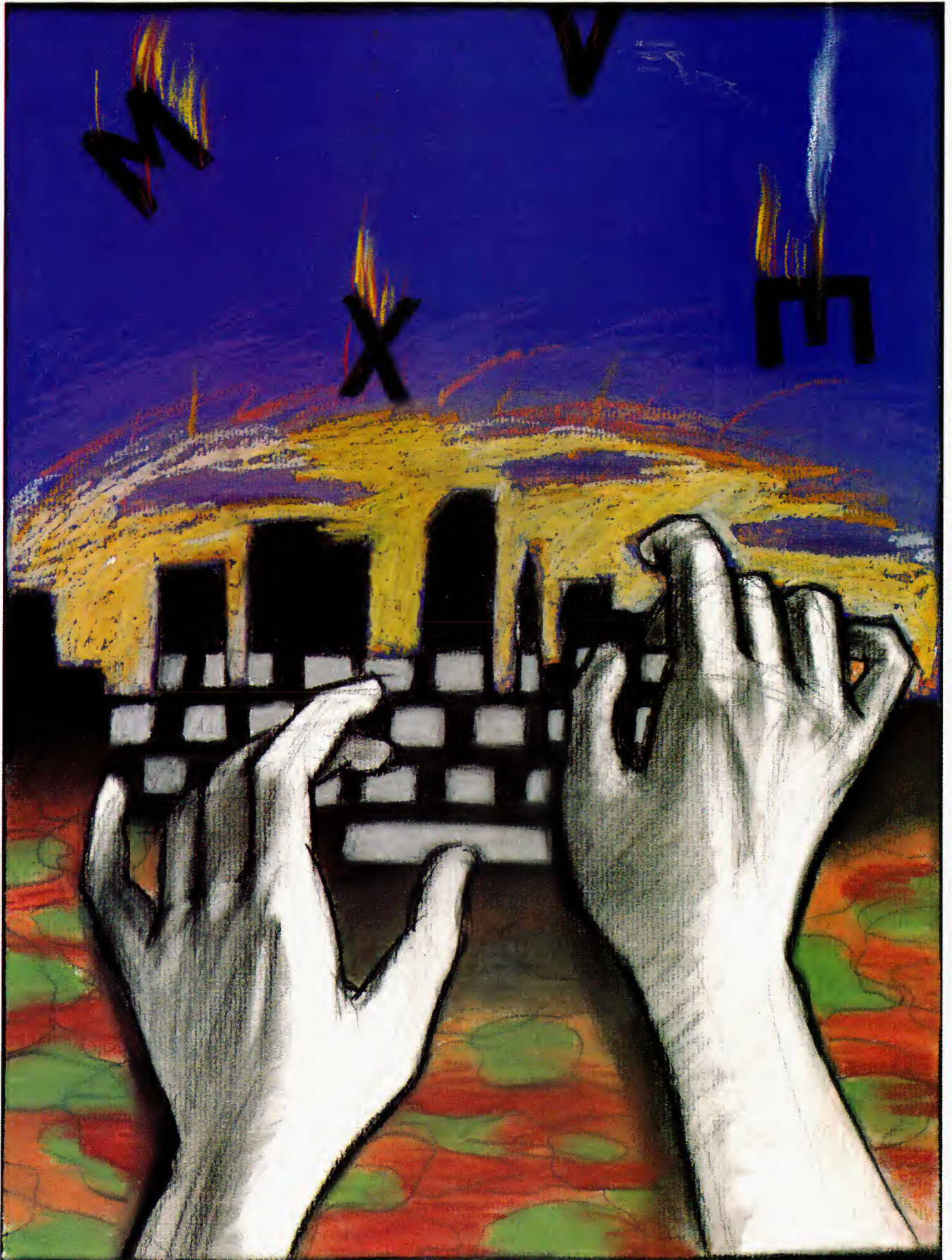
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TYPING

DEFENSE

by Damien Lindauer

The quick brown fox may have jumped over the lazy dog, but this typing method pits home row against alien invaders.

Typing Defense is an exciting, high-resolution educational game, complete with sound effects designed to improve your typing skills by helping you learn your way around the keyboard. Obviously, if you are going to type this program in, you already know how to type. Even so, this program is fun for the experienced typist, while having great educational value for people learning to type.

In the game, you must defend your city from alien attack waves. When an alien attacks, it drops an ASCII-BOMB (a character) on the city. To destroy the bomb before it hits the city, you must press the matching key. If the bomb hits the city before you can hit the correct key, one of your shields will be destroyed. If you have no more shields, the city is vanquished and you have the option to play again. If you manage to defend your city from an entire alien attack wave without a bomb hitting the city, you will receive bonus points.

Game Options

The level option allows you to designate the type of bombs the aliens will drop. The four levels are letters, numbers, symbols, and all types. You even select the speed to determine how fast the bombs will drop. Speed 1 is designed for people just learning about the keyboard, while speed 4 is a challenge to experienced typists. Choose from the following four speeds: slow, fast, very fast, and super fast.

The last option indicates how many shields you want. You are requisitioned any amount from one to nine.

Entering the Program

First, you must enter the shape table. Type CALL - 151 to get into the monitor. Then type in the shape table from **Listing 2**. Next, enter the following line:

BSAVE TYPING DEFENSE.X,A\$4000,
L816

Now type in the BASIC program from **Listing 1**, and save it as Typing Defense.

The BASIC program uses a shape table to create the hi-res characters. The first line of the program sets the LOMEM to 24567. This places the program lines above hi-res page 2 at \$6000, protecting the shape table which is located at \$4000 (hi-res page 2).

A line-by-line description appears in the accompanying **Table**.

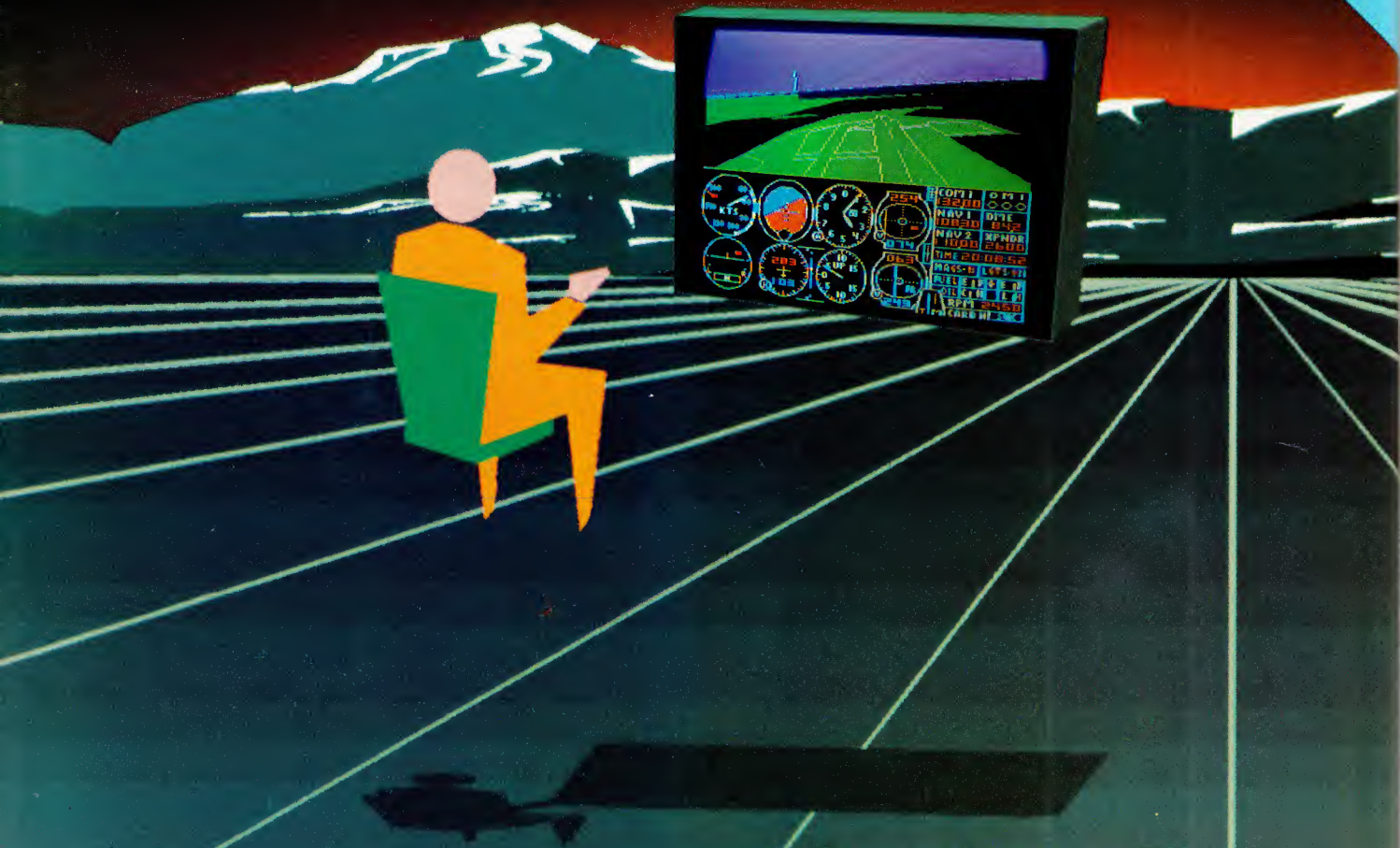
So what are you waiting for? Save your city from annihilation and improve your typing skills at the same time. It's all in a hero's day's work. ■

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**"Obviously, if you are going to
type this program in, you
already know how to type."**

Table. Program description.

Lines	Function
80-90	Randomly decide the type of bomb, and place it and the alien on the screen at a random location.
100-140	Move the bomb toward the city in random patterns, and check to see if you pressed the correct key or whether the city took a direct hit.
150-230	Routine called if the bomb hits the city to change the score, subtract one from the number of shields, and, if you have no more shields, end the game and give you the option to play again.
240-260	Used if you hit the bomb to update your score and check to see if all the bombs in the attack wave were destroyed.
270-310	Used when you successfully complete the attack wave. If you destroyed all of the ASCII-BOMBS in the attack wave without letting any hit the city, you receive bonus points.
320	Subroutine which generates the text on the hi-res screen.
330-400	Allow you to choose your options.
410-460	Set up the hi-res screen.
470-480	Initializing routines.
490-530	Instructions.

Listing 1. BASIC program for Typing Defense.

```

10 LOMEM: 24576
20 REM
30 REM ## LINDAUER SOFTWARE'S
40 REM ## TYPING DEFENSE
50 REM ## BY DAMIEN LINDAUER
60 REM
70 GOSUB 470: GOSUB 330
80 POKE - 16368,0: RL% = (E%(LE%) - B%(LE%)) * RND (
  1) + B%(LE%): VS% = 8 * (7 * RND (1) + 3): HS% = 6
  * (42 * RND (1) + 1): HL% = HS% + 6: VL% = VS% +
  7: DRAW RL% AT HL%,VL%: DRAW SS% AT HS%,VS%
90 IF NL% = 0 THEN NL% = 15 * RND (1) + 15
100 L% = PEEK (- 16336): FOR L = 1 TO DL%: IF PEEK
  (- 16384) = RL% + 159 THEN GOTO 240
110 NEXT L: XDRAW RL% AT HL%,VL%: VL% = VL% + 9
120 L% = 3 * RND (1) + 1: IF L% = 1 AND HL% < 270 THEN
  HL% = HL% + 6
130 IF L% = 2 AND HL% > 6 THEN HL% = HL% - 6
140 DRAW RL% AT HL%,VL%: IF PEEK (234) = 0 THEN 100
150 XDRAW RL% AT HL%,VL%: XDRAW SS% AT HS%,VS%: FOR L
  = 1 TO 3: POKE 768,10: POKE 769,5: CALL 770: POKE
  768,200: POKE 769,5: CALL 770: NEXT L
160 A$ = STR$(LI%): HW% = 192: VW% = 183: HCOLOR = 0: GOSUB
  320: HCOLOR = 3: HL% = HS% + 6: LI% = LI% - 1: A$ = STR$
  (LI%): HW% = 192: GOSUB 320: NA% = NA% + 1: IF NA% =
  NL% AND LI% > 0 THEN X = 1: GOTO 250
170 IF LI% > 0 THEN GOTO 80
180 SCALE = 3: FOR L = 0 TO 64 STEP 3: POKE 768,L + 15
  0: POKE 769,2: CALL 770: ROT = L: DRAW RL% AT HL%,
  VL%: NEXT L: SCALE = 1: ROT = 0: A$ = "THE CITY HAS
  BEEN DESTROYED!": HW% = 57: VW% = 60: GOSUB 320
190 FOR L = 100 TO 180 STEP 8: POKE 768,L: POKE 769,9
  0: CALL 770: NEXT L
200 A$ = "DO YOU WANT TO PLAY AGAIN(Y/N)?:": HW% = 45: VW

```

Listing continued.

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Slimline 40trk (Belt Driven)	\$199.95

Diskettes:

Elephant #1 SS/SD Soft	\$ 15.95
Elephant #2 SS/DD Soft	\$ 18.95

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Wildcard Copy Device	\$ 92.00
Wildcard II Plus	\$135.00
ALS CP/M Card	\$289.95
ALS ZCard II	\$199.95
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Videx Videoterm Combo Pack	\$209.95
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There is a 3% charge for Master Card or Visa. When ordering, please add the following amounts for shipping: Diskettes — \$3.00, Hardware — \$5.00 per order. Personal checks - allow two weeks for bank clearance. NY State Residents add 8.25% Sales Tax. Prices and terms are subject to change without notice.

**"This program is fun for the experienced typist,
while having great educational value
for people learning to type."**

Listing 1 continued.

```
% = 80: GOSUB 320
210 POKE - 16368,0: GET A$: IF A$ = "N" THEN HOME :
    TEXT : VTAB 22: END
220 IF A$ < > "Y" THEN GOTO 210
230 TEXT : GOSUB 330: GOTO 80
240 XDRAW SS% AT HS%,VS%: XDRAW RL% AT HL%,VL%: HPLOT
    2,127 TO HL%,VL%: HCOLOR= 0: HPLOT 2,127 TO HL%,V
    L%: HCOLOR= 3: DRAW 62 AT HL%,VL%: FOR L = 10 TO
    120 STEP 20: POKE 768,L: POKE 769,2: CALL 770: NEXT
    L: XDRAW 62 AT HL%,VL%: X = 0
250 A$ = STR$(SC%):HW% = 42:VW% = 183: HCOLOR= 0: GOSUB
    320: HCOLOR= 3: IF X = 0 THEN SC% = SC% + 1: IF S
    C% > 99999 THEN SC% = 0
260 IF X = 0 THEN NA% = NA% + 1:ND% = ND% + 1: IF NA%
    < > NL% THEN GOTO 290
270 GOSUB 300: FOR L = 1 TO 20: POKE 768,50: POKE 769
    ,30: CALL 770: POKE 768,200: POKE 769,30: CALL 77
    0: NEXT L: HCOLOR= 0: HCOLOR= 0: GOSUB 300: HCOLOR=
    3
275 FOR L = 1 TO 1000: NEXT L: IF ND% = NL% THEN SC% =
    SC% + (NL% * 10): IF SC% > 99999 THEN SC% = 0
280 NL% = 0:NA% = 0:ND% = 0
```

Listing continued.

Listing 2. Shape Table.

4000-	3E	00	7E	00	80	00	86	00
4008-	8F	00	9E	00	AC	00	B8	00
4010-	C5	00	CC	00	D4	00	DB	00
4018-	EA	00	F2	00	F6	00	FC	00
4020-	FF	00	05	01	13	01	1A	01
4028-	27	01	32	01	3C	01	47	01
4030-	55	01	5D	01	6C	01	78	01
4038-	7D	01	82	01	8B	01	93	01
4040-	9B	01	A5	01	B4	01	C1	01
4048-	CE	01	D9	01	E4	01	F0	01
4050-	F9	01	04	02	11	02	19	02
4058-	21	02	37	02	3F	02	4C	02
4060-	65	02	70	02	79	02	86	02
4068-	92	02	9F	02	A7	02	B2	02
4070-	BE	02	CB	02	D7	02	E1	02
4078-	ED	02	F8	02	1C	03	80	00
4080-	09	C4	21	24	24	00	C1	C1
4088-	C1	C1	21	6C	36	06	00	69
4090-	FC	C7	29	2D	E5	1F	C7	29
4098-	2D	E5	1F	6C	05	00	28	35
40A0-	C5	29	F8	0C	3F	C7	69	1C
40A8-	2D	E5	23	00	49	25	FF	63
40B0-	0C	0C	0C	DC	3B	2E	06	00
40B8-	29	0D	1C	DF	6C	0D	DC	3B
40C0-	20	0C	15	36	00	09	C0	C1
40C8-	C1	21	24	00	49	C7	39	20
40D0-	64	0C	05	00	29	28	20	E4
40D8-	1C	07	00	09	0D	F8	1F	0C
40E0-	2D	1C	0C	3F	C7	69	0D	DC
40E8-	07	00	09	20	DC	2D	2D	DC
40F0-	24	00	29	20	04	00	C0	C1
40F8-	29	2D	2D	00	09	05	00	28
4100-	28	28	28	20	00	20	24	64
4108-	2D	15	36	36	1E	3F	C4	61
4110-	0C	04	00	29	E5	24	24	BC
4118-	06	00	2D	2D	DC	1B	0C	0C
4120-	2D	20	1C	3F	17	06	00	A8
4128-	2D	C5	21	1C	67	0C	3C	3F
4130-	3F	00	49	64	3F	3F	64	0C
4138-	0C	36	2E	00	A8	2D	C5	21
4140-	E4	3F	27	2C	2D	2D	00	29
4148-	2D	F8	1B	6C	09	1C	3F	27
4150-	0C	0C	2D	05	00	21	64	0C
4158-	0C	3C	3F	3F	00	29	2D	F8
4160-	1B	6C	09	1C	3F	C7	21	0C
4168-	2D	15	36	00	2D	C5	29	20
4170-	3F	3F	20	0C	2D	15	3E	00
4178-	09	C0	21	20	00	29	20	C4
4180-	21	00	49	E1	1C	1C	0C	0C
4188-	0C	04	00	C0	29	2D	25	38
4190-	3F	3F	00	29	28	28	E0	1C
4198-	1C	04	00	09	C4	21	0C	0C
41A0-	1C	3F	17	06	00	29	2D	DC
41A8-	1B	24	24	0C	2D	15	36	1E
41B0-	27	AC	04	00	24	24	0C	0C
41B8-	15	0E	36	36	C7	C1	39	37
41C0-	00	24	24	24	2D	AD	F6	3F
41C8-	4E	31	1E	3F	04	00	29	2D
41D0-	F8	1B	24	24	0C	2D	15	06
41D8-	00	24	24	24	2D	AD	36	36
41E0-	1E	3F	04	00	24	24	24	2D
41E8-	2D	96	3B	B7	2A	2D	05	00

Listing continued.

The \$129! Modem Starter Set

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*SOURCE offer good through December 31, 1984.

ZOOM Telephonics/207 South St./Boston, MA/02111

Circle 190 on Reader Service card.

Z O O M



"If you manage to defend your city from an entire alien attack wave without a bomb hitting the city, you will receive bonus points."

Listing 1 continued.

```

290 A$ = STR$ (SC%):HW% = 42:VW% = 183: GOSUB 320: GOTO
    80
300 A$ = "ATTACK WAVE COMPLETED!":HW% = 69:VW% = 60: GOSUB
    320: IF ND% = NL% THEN A$ = "ALL ASCII-BOMBS DEST
    ROYED! BONUS:" + STR$ (NL% * 10):HW% = 21:VW% =
    80: GOSUB 320
310 RETURN
320 FOR L = 1 TO LEN (A$): DRAW ASC ( MID$ (A$,L,1)
    ) - 31 AT HW%,VW%:HW% = HW% + 6: NEXT L: RETURN
330 HOME : PRINT : HTAB 8: INVERSE : PRINT "CHOOSE YO
    UR OPTIONS": NORMAL : VTAB 5: HTAB 5: PRINT "LEVE
    L"; TAB( 25);"SPEED": HTAB 5: PRINT "-----"; TAB(
    25);"-----"
340 VTAB 8: PRINT "(1) LETTERS"; TAB( 20);"(1) SLOW":
    PRINT "(2) NUMBERS"; TAB( 20);"(2) FAST": PRINT
    "(3) SYMBOLS"; TAB( 20);"(3) VERY FAST": PRINT "(
    4) ALL TYPES"; TAB( 20);"(4) SUPER FAST"
350 VTAB 14: HTAB 1: PRINT "WHAT LEVEL? ";: GET A$: PRINT
    A$:LE% = VAL (A$): IF LE% < 1 OR LE% > 4 THEN GOTO
    350
360 VTAB 16: HTAB 1: PRINT "WHAT SPEED? ";: GET A$: PRINT
    A$:SP% = VAL (A$): IF SP% < 1 OR SP% > 4 THEN GOTO
    360

```

Listing continued.

Listing 2 continued.

```

41F0- 24 24 24 2D 2D 96 3B 37
41F8- 00 29 2D 24 FF 13 24 24
4200- 0C 2D 2D 00 24 24 24 4D
4208- 31 36 36 3E C0 C1 39 37
4210- 00 29 E5 24 24 1C 2D 05
4218- 00 A8 2D C5 21 24 24 07
4220- 00 24 24 24 4D F1 1E 1E
4228- 0E 0E 0E 05 00 C5 00 49
4230- 39 3F 27 24 24 04 00 49
4238- 39 3F 27 24 24 24 00 24
4240- 24 24 15 0E 2E C0 61 36
4248- 36 36 06 00 24 24 24 95
4250- 0E 0E 8E 24 24 24 04 00
4258- 24 00 29 2D 20 24 E4 3F
4260- 17 36 36 36 00 29 2D 20
4268- 24 E4 3F 17 36 36 06 00
4270- 24 24 24 2D AD F6 3F 06
4278- 00 29 0D 1C DF 6C 0D 24
4280- E4 3F 17 36 05 00 24 24
4288- 24 2D AD F6 3F 0E 0E 0E
4290- 05 00 A8 2D C5 21 1C 3F
4298- C7 21 0C 2D 15 06 00 09

```

Listing continued.

AMPERSOFT

Utility Routines Library for the Apple II/Ie

There you are, sitting in front of a dead screen, wondering if your Apple has broken down or if your program has gone to sleep.

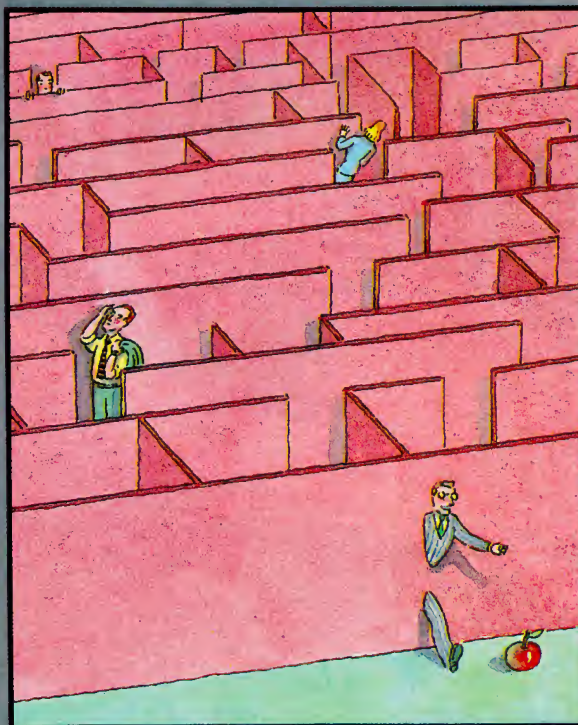
If you're running into slow executions and long and frequent pauses, AMPERSOFT will give you a lot more time to be creative. It's an entire library of Applesoft enhancements that run at machine language speeds.

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They let you Sort sixty times faster than Applesoft. Collect garbage two to three hundred times faster. And format reports to the screen or printer any way you want them.

If you're tired of waiting for your Apple, you don't have to wait any more. AMPERSOFT is here.



Stop Waiting for your Apple.

SPECIFICATIONS:

SPEED ADVANTAGES:

Garbage collection — 300x faster.
Sorting — 60x faster.
Disk array Sort/Recall — 16x faster.

OTHER FEATURES:

30% more user program memory.
Matrix arithmetic.
Selective array clear.
Full PRINT USING formatting for numbers and character strings.
Two-key disk commands.
Compatible with GALE, PLE, FID, MUFFIN, COPYA and all DOS Toolkit programs.
Allows concurrent residence of Applesoft and Integer BASIC with 32K RAM card, extra 16K card, or ROM card in another slot.

AUTHOR:

Cornelis Bongers

SYSTEM REQUIREMENTS:

At least 64K, Applesoft, DOS 3.3 and one Disk Drive. Operates with all Applesoft-Compatible computers including the Apple IIe and the Franklin ACE. Apple II Plus requires RAM card — 16K or larger.

PRICE:

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Circle 177 on Reader Service card.

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It's the best 300/1200 baud 212A telephone modem for your Apple® II, II+, and IIe. "Best" because it's the easiest to install and use, provides more useful modem features for your money, and lets you add software capabilities as your needs grow.

We really do mean easy. Just plug the ProModem Card Pack into any expansion slot and connect the telephone cord. On-board intelligent software in ROM includes a simple but powerful terminal program. With a few keystrokes, you'll be "on line" and communicating.

ProModem 1200A offers you the best price-to-performance modem available with Auto-Answer and Auto-Dial, Programmable Intelligent Dialing, Built-in Speaker with Volume Control, Help Commands, Extensive Diagnostics, and more.

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PRICE COMPARISON

PROMETHEUS

- (1) ProModem 1200A Apple Card Pack, complete with on-board software and all necessary hardware
- List Price: \$449

HAYES

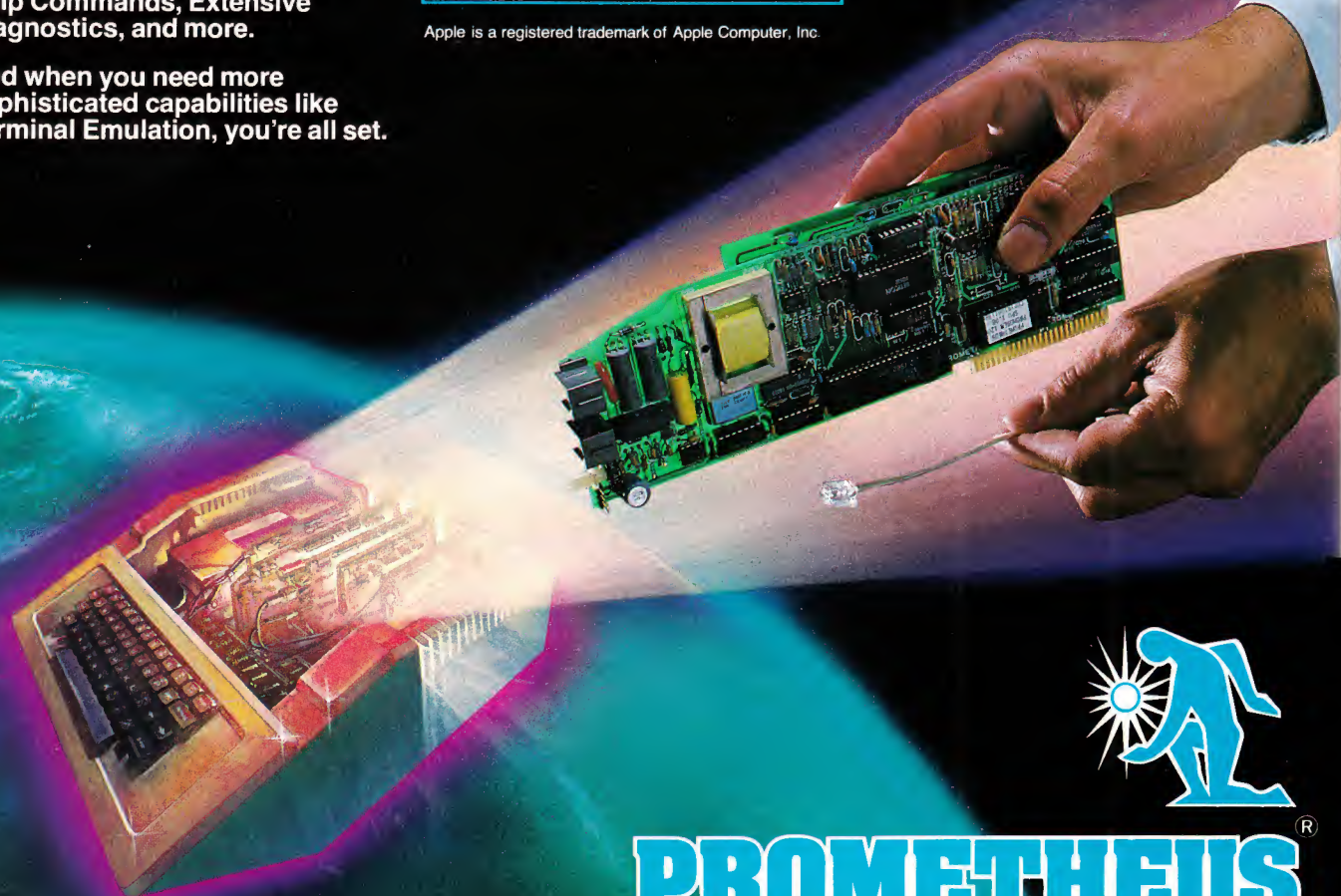
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 - (3) RS-232C Cable
 - (4) Communications Software
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**"Save your city from
annihilation and improve your
typing skills at the same time."**

Listing 1 continued.

```

370 DL% = SP% - 1:DL% = 15 - (5 * DL%)
380 VTAB 18: HTAB 1: PRINT "HOW MANY SHIELDS(1-9)? ";
    : GET A$: PRINT A$:LI% = VAL (A$): IF LI% = 0 THEN
    GOTO 380
390 VTAB 22: HTAB 8: PRINT "PRESS ANY KEY TO BEGIN.";
    : GET A$
400 POKE 233,64: POKE 232,0: HGR : HCOLOR= 3: ROT= 0:
    SCALE= 1: POKE - 16302,0
410 A$ = "TYPING DEFENSE":HW% = 93:VW% = 8: GOSUB 320:
    HPLT 91,0 TO 177,0 TO 177,10 TO 91,10 TO 91,0
420 FOR L = 175 TO 182 - 47 STEP - 7: DRAW 60 AT 0,L
    : NEXT L: DRAW 2 AT 0,134: FOR L = 5 TO 279 STEP
    5: FOR L2 = 175 TO 182 - INT (40 * RND (1) + 1)
    STEP - 7: DRAW 60 AT L,L2: NEXT L2: NEXT L
430 A$ = "SCORE: 0":HW% = 0:VW% = 183: GOSUB 320:A$ =
    "SHIELDS: " + STR$ (LI%):HW% = 138: GOSUB 320:A$
    = "LEVEL: " + STR$ (LE%):HW% = 0:VW% = 191: GOSUB
    320:A$ = "SPEED: " + STR$ (SP%):HW% = 150:HW% =
    150: GOSUB 320
440 GOSUB 460: FOR L = 1 TO 5: FOR L2 = 1 TO 200 STEP
    5: POKE 768,L2: POKE 769,3: CALL 770: NEXT L2: NEXT
    L: HCOLOR= 0: GOSUB 460: HCOLOR= 3
450 NL% = 0:NA% = 0:ND% = 0:SS% = 61:SC% = 0: RETURN
460 A$ = "RED ALERT: ALIEN APROACHING":HW% = 57:VW% =
    60: GOSUB 320: FOR L = 1 TO 1000: NEXT L: RETURN

470 NORMAL : TEXT : HOME : VTAB 10: PRINT "INITILIZIN
G...": PRINT CHR$ (4);"BLOAD TYPING DEFENSE.X"
480 FOR L = 0 TO 23: READ L2: POKE 770 + L,L2: NEXT L
    : FOR L = 1 TO 4: READ B$(L): READ E$(L): NEXT L:
    DATA 174,0,3,173,48,192,136,208,5,206,1,3,240,9
    ,202,208,245,174,0,3,76,5,3,96,34,59,17,26,2,16,2
    ,59
490 NORMAL : TEXT : HOME : HTAB 7: PRINT "LINDAUER SO
FTWARE PRESENTS": PRINT : HTAB 13: INVERSE : PRINT
"TYPING DEFENSE": NORMAL : PRINT : HTAB 11: PRINT
"BY DAMIEN LINDAUER"
500 PRINT : PRINT : PRINT " AN EDUCATIONAL COMPUTER
GAME DESIGNED TO IMPROVE YOUR TYPING SKILLS."
510 PRINT : PRINT : PRINT " INSTRUCTIONS: DESTROY T
HE ALIENS ASCII-BOMBS, BEFORE THE HIT THE CIT
Y. TO DO THIS, PRESS THE COINCIDING KEY, WHIL
E THE BOMB IS FALLING. IF A BOMB"
520 PRINT "HITS THE CITY, ONE OF YOUR SHIELDS WILL BE
DESTROYED. IF YOU HAVE NO MORE SHIELDS, TH
E CITY IS DESTROYED, AND THE GAME IS OVER."
530 PRINT : PRINT : HTAB 7: PRINT "PRESS ANY KEY TO C
ONTINUE. ";: GET A$: RETURN

```

Listing 2 continued.

```

42A0- 24 24 E4 2B 2D 2D 00 29 42E8- 0C 3C 3F 3F 00 24 24 24
42A8- 2D 20 24 24 DF 33 36 36 42F0- 2D 2D 36 36 36 3F 27 00
42B0- 06 00 C0 21 24 6C 09 36 42F8- 49 49 29 2D 2D 60 49 3F
42B8- 36 1E 1E C7 39 00 24 24 4300- 3F 3F 3F 3F 3E 38 3F C7
42C0- 24 4D 31 36 36 3E 38 20 4308- 29 C5 29 2D 2D 2D 2D 2D
42C8- 97 06 00 64 C5 39 38 20 4310- 75 25 D8 DB 1C 3F 24 97
42D0- 4D 31 1E 16 0E 36 00 09 4318- BF 07 00 DF DF 72 6A C1
42D8- 24 3C 38 20 4D 31 1E 06 4320- 09 0C E0 38 98 C3 39 98
42E0- 00 2D 2D DC 1B 0C 0C 0C 4328- 1B 16 06 00 00 00 FF FF

```

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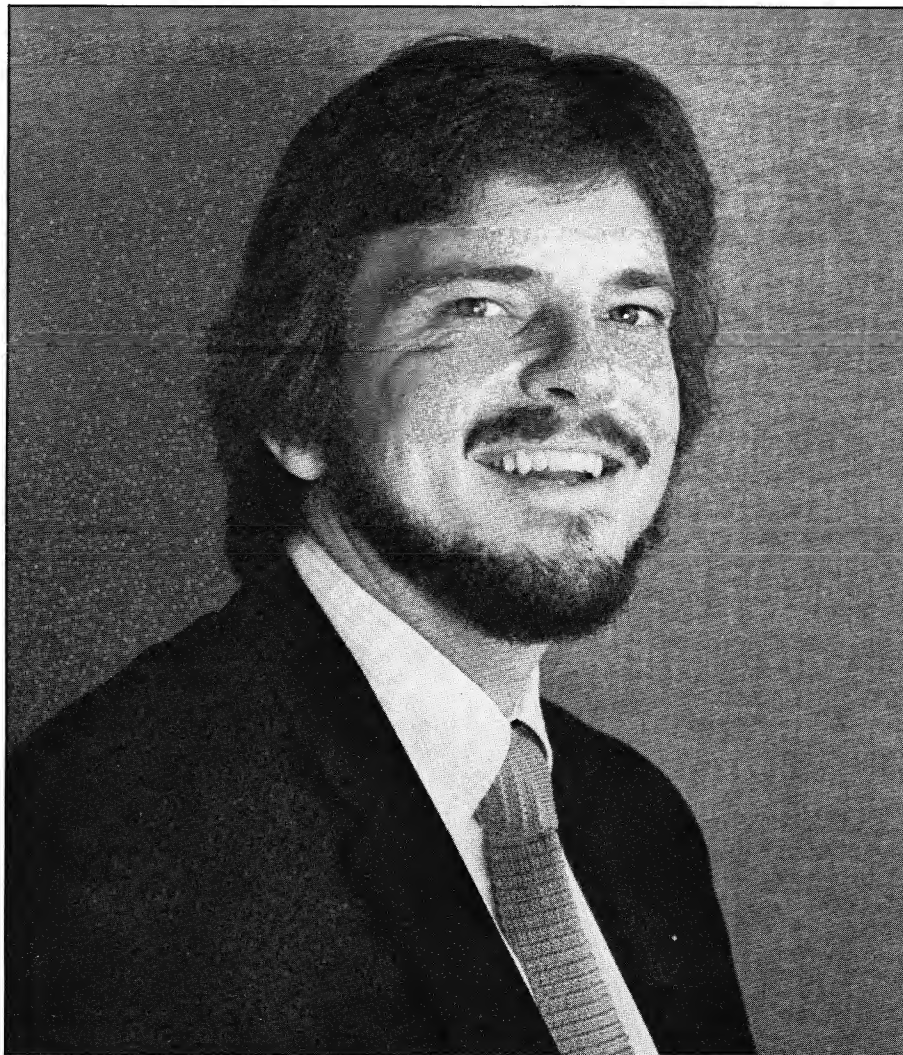
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The Apple II line keeps pace with technology and people's needs.

by Paul Quinn

Far—in terms of time, if not in distance—from the mad-ding crowd at the //c's show-stopping debut, what future does Apple project for the Apple II product line?

Dave Larson, Director of Marketing for the Apple II Group, has been with the company for over three years. He has experience in both domestic and international marketing of Apple computers and peripherals.

In an exclusive interview with inCider, Larson shares the results of some of Apple's own market research—suggesting that “Apple II Forever!” is more than a mere slogan: It's a self-fulfilling prophecy.

inCider: Put yourself in the shoes of the average buyer coming into the store to shop for an Apple. How is he or she going to choose between a //c and a //e?

DAVE LARSON

BRINGING APPLES TO MARKET

“The //c will meet most people's needs.”

“We believe that women are important in the buying process.”

“Over half of the people in our audience who have kids will buy //c's and //e's.”

INTERVIEW

Larson: Let me give you a little background on our research and what we've learned with the development of the //c. We've effectively spent more market research dollars to understand the //c marketplace than we've spent collectively at Apple in the past. So we've put a lot of money into trying to understand what people do with personal computers—primarily the people who buy with their discretionary funds. We did a lot of focusing on hardware features. And out of that we learned specifically what features we wanted to build into the CPU.

We also did additional market research that was fascinating: We put recent //e purchasers, IBM purchasers, and Commodore purchasers into focus groups, and asked them to talk about their experience of buying the product, how it was to get up to speed, what their level of knowledge was. And we had all the people writing our manuals sitting behind a [one-way] mirror watching these people, which was interesting, needless to say.

We used other focus groups to determine what, from an aesthetic point of view, people thought of the look of our products.

inCider: Specifically the color?

Larson: Specifically the monitor. We found that, historically, computers look pretty much like boxes, and have not been a pleasing-looking piece of furniture. And we really felt that that was important, so you can see that's reflected in our design.

Another thing we learned is that if you look hierarchically at what's important to people, they want to go with things that are easy to learn, easy to set up. They want a system they can transport. So we found out those are the primary motivators, in addition to

the kinds of things everybody wants—you know, quality and so forth. And something that kept coming up that is even more important: They want a company that will be around awhile and a product that won't become obsolete.

We also did focused research on women's attitudes about buying personal computers, because we believe that women are very important in the buying process when people use their own funds.

inCider: Can you qualify "women" a little bit?

Larson: Our research was broken up into [categories]: women who work, women who don't work, and within each of those groups, women with kids and women without kids. We were looking primarily for two elements: One was how children affect the purchasing decision, and the other was what motivates women in terms of personal computers.

We found the one group that is distinctive is the group of women who have school-age children. They're motivated by a product with adequate educational software, and by various members of the family being able to do something with the computer. The other audiences—women who don't have kids, whether they work or not, and men—are most concerned that computers do a lot of personal productivity things, serious work, as well as have a breadth of software.

When we looked at the criteria people presented to us, we started with the nicely-designed machine you can carry around. And we built a handle, and designed it so that you just disconnect two cords. There's a dual motivation: People at their offices at home and at their offices at work will

use the computer. And then they'll use it with their TV for entertainment and education. People will probably evolve into having several work stations, with a power supply and an RF modulator or monitor hooked up somewhere, and they'll just move from place to place.

inCider: At the //c unveiling, I was impressed by the dealers' reaction. They've got to watch their inventory dollars yet were prepared to plunk the money down for their original stocking orders. I asked a few dealers what they felt would be the impact of the //c on the //e sales. Obviously it was conjecture, but they felt the //c would cut into the //e sales. Do you agree?

Larson: Let me go back to your question "If somebody walks into the store, what will he buy?" I digressed to what we did with the //c.

We built a complete solution and made it a "merchandisable" package so people can understand what they're buying. The //c will meet most people's needs. But there are a couple of audiences for whom that isn't true. The first is the hobbyist; I'm using that term somewhat loosely, but it's somebody willing to configure his or her own system. Because the //e—at \$995 with the drive—is the least expensive Apple product, people with the expertise and the desire to configure their own, and have a real expandable system, will still buy the //c. Also in that category will be educational sales, because we're still focusing very clearly on the //e in the educational channel. For another market for the //e—the small or single-proprietor type business—we've configured the bundled system. By and large, most people are going to walk out of the store with a //c. But if they want an

"People want to go with things that are easy to learn and set up."

"And they want a company that will be around for awhile."

"We built a complete solution."

entry-level, low-cost, configure-it-them-selves system, or a fully configured and yet expandable business system, then those are the categories where we're going to see the //e sold retail.

inCider: Let's take the second subset: the small business environment with the bundled //e system. Do you see an overlap between that and the Macintosh market?

Larson: I absolutely do—to a degree. There is some overlap that is pretty healthy, and with time there will be more of an overlap as Macintosh evolves. We'd much rather have an overlap so they buy one of the other Apple products, versus competitive products. As more software evolves for Mac, in small-business applications specifically, there will be more vertical market applications evolving, so it will be a more viable product. But you'll find the II to be extremely strong because of the breadth of software.

inCider: Is it important that a student can take the //c easily from home to school and back?

Larson: I don't think the portability of the CPU is as important as the portability of the media in those two environments.

inCider: How many third-party developers are now working on //c products?

Larson: The number of third-party people was about 150 at intro, and I suspect it's more now.

inCider: Do you foresee problems occurring when a developer comes out with a product that is //c-specific? Because of the //c's larger memory, we've noticed some inconsistencies between, for example, PFS:Write's operation on the //c and on the //e. Do you see more of that coming up?

Larson: I can tell you that what we're seeing is an evolution. Most of these products are backwards-compatible, in the sense that if you have an Apple II properly configured, it will work. But you may have to upgrade your configuration to optimize the features. The other thing we see is software being developed that's intelligent enough to look at the machine and say, "It's a //e with 64K," or "//e at 128K," or "a //c." And it will optimize on the machine. It's the same kind of thing with other enhancements. Some of the new software has mouse enhancements and works with a

mouse or without a mouse. Double hires is another thing that we're seeing enhancements on. There are tools and utilities evolving pretty quickly that will allow one product to work on multiple machines.

inCider: How important is the mouse in the future of the II family?

Larson: Well, we're putting a lot of emphasis on the mouse. It's an important technology that expands the concept of ease of use. And we think for new users of personal computers, ease of use is important. So I think you're going to see more and more evolving software that uses the mouse. I don't think you'll ever see it as integral as with the Macintosh, because the basic premise of Mac includes a mouse, and we're moving from a different evolutionary point.

I watch people who've never used a computer before, and initially they really like a mouse. It's a nonthreatening way to become involved with a personal computer.

inCider: Do you see Apple employing the college consortium route, similar to the one that the Mac employed?

Larson: No, the college consortium is really a focus on Mac—not the II family—because the college environment, besides business, is the Mac's other focus. It's not our focus. Our focus is K-12, so you won't see an aggressive program with the //c in that channel.

inCider: Do you have plans to market the II line more actively in business?

Larson: Yes, we will. It won't be the dominant part of our campaign, but elements of marketing will be focused on the business marketplace, most specifically in the small-business environment with the //e. Then with time, when we have the flat panel display and the battery packs available, I think there will be more of a focus on the portability element of the machine for businesspeople.

inCider: Can you foresee a time when Apple might release a machine built around the 65816 chip, which would give the Apple capability of accessing larger amounts of memory?

Larson: I can't really talk about it.

inCider: Will we ever see a II product in the \$500 to \$800 category?

Larson: Well, you almost have right now, with the //e.

inCider: Apple has targeted the home market with the //c, but is the world

ready for a serious computer in the home, and if so, for what applications?

Larson: We believe so, and we've been doing a lot of testing of that assumption. I think everybody's looking for an answer like VisiCalc. There is no such answer in the home marketplace. What we find is a collection of things that people want to do. It's not just one thing; it's usually a number of things.

Over half the people who have kids in our audience will be buying Apple //c's and Apple //e's. If they're going to buy them from discretionary funds, over half will have education as their main motivation. So we think that's an important element, and really the major element. Other motivators are business management, hobbies, personal finance, and personal productivity growth.

Communication is really emerging, and with banking and other personal services evolving quickly, that's going to be really an avenue where personal computers are opened up to the world in a much broader way. The other thing we know people will use the personal computer for is entertainment.

inCider: Is the //c a perfect machine or can it still be improved somehow?

Larson: Nothing is ever perfect. And I don't know if it can be improved. But I think what is important, and what we are getting better and better at, is reducing the size of our technology and expanding the capabilities.

inCider: How about speed? Is hardware speed an important consideration in the II market?

Larson: I think it's an important consideration, but what is most important is the benefit you derive from the application.

inCider: Do you ever feel that modern technology used by other microcomputers is leaving the II in the dust?

Larson: I sure don't think so, and it doesn't appear to be that way from the marketplace. As new technologies emerge, we're building them into the machine. We've got the mouse, and, as they emerge, battery, flat panel, and printer technologies. A computer is only as good as the entire system around it, and all of those system components are going through great technological change, so our main objective is, as new technologies emerge, to use them on the II. We believe it's going to go on forever. ■

Recover a Protected File in MBASIC

Any Apple CP/M user who likes to take advantage of the power and elegance of MBASIC knows that there are three ways to save an MBASIC program on disk.

A program saved the ordinary way becomes a binary file, in which MBASIC commands are represented by "tokens" or special byte values to conserve space. A program can also be saved with the .A option where A stands for ASCII. This way the program is stored as a text file of ASCII character values, exactly as the program would appear in a listing.

The final and most mysterious way to save an MBASIC program is with the .P option. Any program saved in this manner is stored in encoded form, and subsequently cannot be listed or edited. Such a protected program can only be executed, and if you don't have a listing in the original form, your code will never see the light of day.

Until now, that is. Here is a fast, simple way to restore a protected file to its original, readable self. The first thing to note is that a protected file is exactly the same length as its unprotected equivalent, and the lead byte of the protected file has the identifying hexadecimal value FE.

The trick is that MBASIC loads any program file by converting it to the standard format and storing it at location 628FH. All that needs to be done to translate a protected file into an unprotected one is to load it into memory with the MBASIC command LOAD. A quick exit via the SYSTEM command leaves the program file undisturbed and allows you to use DDT and SAVE to save

the program in a new, unprotected disk file.

For example, suppose you have a program file called SECRET.BAS that was saved with the .P option and you want to examine and perhaps alter it. Assume you start at CP/M system level. First, we need to know the length of the file. The CP/M utility DDT.COM will tell you this. Simply type DDT SECRET.BAS. The response will look like this:

```
NEXT PC
nnnn 0100
```

The value under NEXT is the hexadecimal address of the byte immediately following the file, which is stored at memory locations 0100H through (nnnn-1). To calculate the length of the file in pages, take this number less one, and convert the two higher order digits to a decimal value. Suppose the test went as follows:

```
DDT SECRET.BAS
NEXT PC
2880 0100
```

You'll see that 2880H less one is 287F. The higher order digits are 28, which equals 40 in decimal. The file, therefore, is 40 pages long.

Now we know the length of the file and can proceed. Type control-C to exit DDT.COM, and then type MBASIC to enter BASIC command level. Now load the program with the command LOAD"SECRET". SECRET.BAS is now in memory in its unprotected, binary, tokenized version. Any PEEKs at this point will fail because MBASIC doesn't intend users to have access to the program. Undaunted, we type SYSTEM to return

to CP/M level. Now perform the following commands in sequence:

```
control-C
SAVE no-pages SECRET.BAS
```

And that's all. Try loading SECRET.BAS and listing it to confirm that you have converted it back to an unprotected program.

What happened? You entered the utility program DDT.COM which manipulated the Apple's memory. The second line above took the program stored in locations 628FH through last-byte and moved it up to starting location 101H. To determine the number value of the address last-byte, use the following quick rule of thumb: Take the value nnnn previously supplied by DDT.COM and add it in hexadecimal arithmetic to the value 618D. In the earlier example, you would add 2880 to 618D for the result 8A0D. The command would be M628F, 8A0D,101.

The next three lines insert the value FF at location 100H to serve as the loading-byte indicator that the file is a standard MBASIC program. The control-C exits DDT.COM and SAVE stores the new version of the program file on the disk. You've already seen how to determine the number value of no-pages.

The .P option is still a useful way to discourage naive users from messing with working versions of your programs, but now a hasty or inappropriate decision to save a program need not be a forever thing. ■

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HINTS 'N' TECHNIQUES

Garbage Clearing

One problem often encountered in programming with Apple-soft BASIC is garbage collection. When DOS 3.3 replaces the contents of a string variable with a new string, the old string is not deleted from memory, even though it is no longer needed. It just goes on taking up space in memory. Massive quantities of garbage can be collected in memory this way. When necessary, DOS will initiate the garbage collection procedure, clearing away all this rubbish.

The procedure can seem to take as much time as the New York City garbage collection procedure when the sanitation workers are outside your window at 5 a.m. For several minutes your program must halt operation.

However, in many cases, there is an alternative to the DOS garbage collection cycle. At regular intervals, have your program check the amount of free space remaining in memory (see **Listing 1**, line 100). When free space is reduced beyond a certain point, do the following:

1. Open a disk file called PASSDATA or a similar appropriate name (lines 500-510).
2. Save to PASSDATA all variables your program needs to continue operation (lines 520-580).
3. Execute CLEAR. This destroys all garbage in memory (line 590).
4. If your program uses arrays of variables, repeat your DIM statements (line 590).
5. If you have an ONERR GOTO statement in effect, repeat it (line 590).
6. Load your variables back in from PASSDATA (lines 600-670).

7. Delete PASSDATA (line 670).

8. Continue with your program (line 680).

The CLEAR statement "sets all variables to zero and all strings to null," according to my old Applesoft manual. What it does not do, and this can be very important, is interfere with DOS's ability to keep track of any text files that are open. This means that if your program is reading in data from a text file, or writing to a text file, those operations will not be interfered with by the above procedure. The text files open will remain open. You must execute a READ or WRITE statement again before reading from or writing to any open file.

Listing 2 contains a second example of this technique. The program illustrates how quickly your Apple's memory can be chewed up under extreme circumstances. It displays the amount of free space remaining in memory (line 100), while continually concatenating a series of string variables (line 170). As you type at the keyboard, the contents of the string variables are shown on the screen, as well as the amount of free space in memory. When the amount of free space decreases below 1K (1024 bytes), the garbage clearing routine is activated (lines 200-350).

The DOS garbage collection procedure is the price we pay for DOS's dynamic string allocation, which saves us the trouble of having to de-

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by Viktor Rubinfeld

clare the length of every string variable we use, and as such serves an important purpose. However, the

procedure described above can in many cases eliminate the need for the garbage collection cycle. ■

Listing 1. Garbage clearing.

```
100 FREESPACE = ( PEEK(111) + 256 * PEEK(112) ) -
    ( PEEK (109) + 256 * PEEK(110) ); IF FREESPACE < 1024
    THEN 500: REM *** GOTO GARBAGE CLEARING ROUTINE ***

110 REM : MAIN PROGRAM CONTINUES HERE

500 D$ = CHR$(4):PRINT:PRINT D$;"OPEN PASSDATA"
510 PRINT D$;"WRITE PASSDATA"
520 REM:SAVE STRING VARIABLES
530 PRINT A$;PRINT B$;PRINT C$
540 REM:SAVE REAL VARIABLES
550 PRINT A:PRINT B:PRINT C
560 REM:SAVE ARRAY OF REAL VARIABLES
570 FOR Z = 1 TO 50:PRINT ARRAY(Z):NEXT
580 PRINT D$;"CLOSE PASSDATA"
590 CLEAR:DIM ARRAY(50):ONERR GOTO 1000
600 D$ = CHR$(4):PRINT:PRINT D$;"OPEN PASSDATA"
610 PRINT D$;"READ PASSDATA"
620 INPUT A$:INPUT B$:INPUT C$
630 INPUT A:INPUT B:INPUT C
660 FOR Z = 1 TO 50:INPUT ARRAY(Z):NEXT
670 PRINT D$;"CLOSE PASSDATA":PRINT D$;"DELETE PASSDATA"
680 GOTO 110
```

Listing 2. Garbage clearing with a free space counter.

```
10 REM *****
    GARBAGE CLEARING
    ILLUSTRATION
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    *****

20 TEXT : HOME :D$ = CHR$(4)
30 PRINT "THIS PROGRAM ILLUSTRATES THE GARBAGE CLEARING TECHNIQUE.": PRINT "PRESS ANY KEY.": GET A$

40 HOME : DIM ST$(3):A = 1: VTAB 19: HTAB 1: INVERSE: PRINT "FREE SPACE REMAINING.": NORMAL: VTAB 1: HTAB 1

50 FRSPACE = ( PEEK (111) + 256 * PEEK (112) ) - ( PEEK (109) + 256 * PEEK (110) )

60 FR$ = STR$(FRSPACE): FOR B = 1 TO LEN (FR$): POKE 1615 + B, ASC ( MID$(FR$,B,1) ) + 1
28: NEXT : POKE 1615 + B,160

70 GET A$
80 REM : DO NOT PERMIT <,> <"> <"> OR RETURN CHARACTER. SPECIAL ROUTINES WOULD BE REQUIRED TO INPUT THESE CHARACTERS FROM DISK.

90 AA = ASC (A$): IF AA = 13 OR AA = 34 OR AA = 44 OR AA = 58 THEN 70

100 FRSPACE = ( PEEK (111) + 256 * PEEK (112) ) - ( PEEK (109) + 256 * PEEK (110) )

110 REM : POKE CONTENTS OF FRSPACE DIRECTLY INTO MEMORY LOCATIONS ON THE TEXT PAGE SO AS NOT TO MOVE THE CURSOR.

120 FR$ = STR$(FRSPACE): FOR B = 1 TO LEN (FR$): POKE 1615 + B, ASC ( MID$(FR$,B,1) ) + 1
28: NEXT : POKE 1615 + B,160

130 IF FRSPACE < 1024 THEN 200

140 REM : 238 IS MAXIMUM NUMBER OF CHARACTERS DOS WILL INPUT TO A GIVEN STRING VARIABLE FROM DISK

150 IF LEN (ST$(A)) > 238 THEN A = A + 1: IF A > 3 THEN VTAB 22: HTAB 1: PRINT "DEMONSTRATION CONCLUDED.": END

160 REM : INCREMENT STRING VARIABLE.

170 ST$(A) = ST$(A) + A$
180 PRINT A$:
190 GOTO 70

200 REM : GARBAGE CLEARING PROCEDURE.

210 PRINT : PRINT D$;"OPEN PASSDATA": PRINT D$;"WRITE PASSDATA"

220 REM : SAVE VARIABLES TO DISK

230 PRINT A: PRINT A$: FOR B = 1 TO A: PRINT ST$(B): NEXT

240 PRINT D$;"CLOSE PASSDATA"

250 REM : DELETE GARBAGE FROM MEMORY WITH CLEAR STATEMENT.

260 CLEAR :D$ = CHR$(4)

270 REM : READ VARIABLES BACK IN FROM DISK.

280 PRINT D$;"READ PASSDATA"

290 INPUT A: INPUT A$: FOR B = 1 TO A: INPUT ST$(B): NEXT

300 PRINT D$;"CLOSE PASSDATA"

310 FRSPACE = ( PEEK (111) + 256 * PEEK (112) ) - ( PEEK (109) + 256 * PEEK (110) )

320 FR$ = STR$(FRSPACE): FOR B = 1 TO LEN (FR$): POKE 1615 + B, ASC ( MID$(FR$,B,1) ) + 1
28: NEXT : POKE 1615 + B,160


330 ST$(A) = ST$(A) + A$: VTAB 1: HTAB 1: FOR C = 1 TO A: PRINT ST$(C): NEXT

340 REM : RETURN TO MAIN PROGRAM USING GOTO STATEMENT.

350 GOTO 70
```

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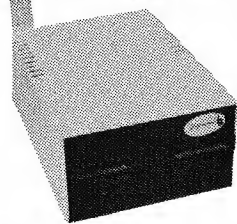
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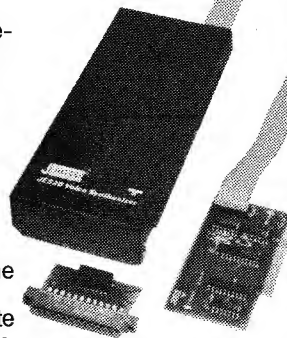
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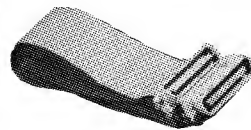
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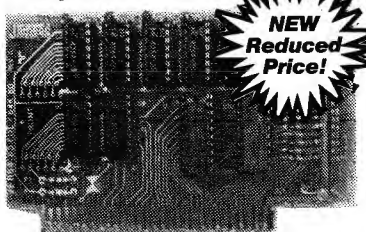
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JE614 \$89.95

Solutions to *inCider's* inSidious inSolubles from page 73

Solution to The Factorial:

All Applesoft variables start a program with a value of 0. Therefore, the variable FACT must be set to 1 at the start of the loop. 30 PRINT : FACT = 1 will solve the problem. I told you this one was easy, but try a number like 33 or 34 when the program asks you for a number.

Solution to Messy Input:

Volume numbers start at 0, but if you changed line 60 to read 60 IF V < 0 OR V > 255 THEN 500, you prob-

ably found it created more problems than it solved. All those punctuation characters and the letter "E" will be accepted and return a value of 0 for V. One of many solutions is to eliminate the POKE in line 500 so the error flag is never cleared. Then change lines 40, 50, and 60 to:

```
40 INPUT V$: V = VAL (V$): PRINT
50 IF ASC (V$) = 48 THEN 100
60 IF V < 1 OR V > 255 THEN 500
```

Were you able to find a more simple solution?



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THE TIMES (San Mateo)

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APPLE EXTRACT

A reprise of the reviews that have appeared in inCider in the last six months. Prices subject to change without notice.

- | | |
|------|-----------------|
| ★★★★ | Superlative |
| ★★★ | Above average |
| ★★ | Good |
| ★ | Not recommended |
| | Stay away |

Software

Access II

★★★★

Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014
Communications, August '84.
A sophisticated yet easy to use terminal package. ProDOS based. \$75.

AccountingPlus Super/e

★★★★★

Ask Micro, P.O. Box 1100, 100 Blue Ravine Road, Folsom, CA 95630
Business, March '84.
An outstanding accounting package for the //e. All it needs is a shorter name. GL-\$450. AP, AR, Inv-\$350. Payroll-\$450.

Accounts Receivable

★★★★

BPI Systems, 3423 Guadalupe, Austin, TX 78705
Business, June '84.
Get a handle on your business. This package does what an AR package should. \$395.

Alphabet Beasts and Company

★★★

Reader's Digest Software, Microcomputer Software Division, Pleasantville, NY 10570
Education, July '84.
Beautiful graphics help youngsters learn how to draw numbers, letters, and strange creatures. \$34.95.

AppleWorks

★★★★★

Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014
Business, July '84.
A superb integrated package featuring a word processor, a spreadsheet, and a data base manager. An excellent value. \$249.

BASIC Tutor

★★★

Supersoft, Inc., 1713 S. Neil Street, Champaign, IL 61820
Education, August '84.
A solid instructional package for people interested in learning Applesoft BASIC. Schools can take advantage of a multiple copy policy. \$99.95.

Beagle Basic

★★★★★

Beagle Bros, Inc., 4315 Sierra Vista, San Diego, CA 92103
Language, March '84.
The world's favorite software company has liberated Applesoft from ROM and programmers from Applesoft. \$34.95.

Break the Bank Blackjack

★★★

Gentry Software, 9411 Winnetka Avenue, Chatsworth, CA 91311
Entertainment, July '84.
This program teaches you how to count cards when playing blackjack. \$24.95.

Carrier Force

★★★★

Strategic Simulations, Inc., 883 Stierlin Road, Building A-200, Mountain View, CA 94043
Strategy game, August '84.
A war game that simulates a number of famous air-sea battles of the Pacific Theater in World War II. A super challenge. \$59.95.

Caverns of Callisto

★★★

Origin Systems, Inc., P.O. Box 58009, Houston, TX 77258
Arcade game, June '84.
It's a long walk (400 million miles) back to Earth if you don't find the parts stolen from your spaceship. \$34.95.

Chivalry

★★★

Weekly Reader Software, 245 Long Hill Road, Middletown, CT 06457
Arcade game, June '84.
Beautiful graphics enhance this game set in days of yore. A great game for kids. \$49.95.

Circascript

★★★

Circadian Software, Inc., Box 1208, Melbourne, FL 32902
Word processor, May '84.
A low cost WP with a lot of professional features. Ideal for students and small businesses. \$39.95.

The Coveted Mirror

★★★

Penguin Software, 830 4th Avenue, Geneva, IL 60134
Adventure game, August '84.
An adventure game with some arcade features included. Be careful—King Voar is watching! \$34.95.

Cubit

★★★

Micromax, 6868 Nancy Ridge Drive, San Diego, CA 92121
Arcade game, May '84.
An Apple clone of Q-Bert. Explore the mysteries of pyramid power. \$39.95.

Cut & Paste

★★★

Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403
Word processor, May '84.
A lot of features for a little money. A good value for computer novices. \$49.95.

Death in the Caribbean

★★★

Micro Fun, 2699 Skokie Valley Road, Highland Park, IL 60053
Adventure game, April '84.
Danger lurks everywhere in this hi-res adventure. After playing this, snow won't seem so awful after all. \$35.

Disk Quick

★★★

Beagle Bros, Inc., 4315 Sierra Vista, San Diego, CA 92103
Utility, June '84.
Turn the extended 80-column card in your //e into a RAM disk. \$29.50.

The Eating Machine

★★★

Muse Software, 347 North Charles Street, Baltimore, MD 21201
Home, July '84.
A cut above the average self-improvement program. The Eating Machine helps you plan a healthy diet. \$49.95.

Electronic Playground

★★★

Software Entertainment Company, 537 Willamette Street, Eugene, OR 97401
Education, August '84.
Games for three- to eight-year-olds, including a kaleidoscope, a matching game, and a drawing program. \$24.95.

The Factory

★★★

Sunburst Communications, Inc., 39 Washington Avenue, Pleasantville, NY 10570
Education, July '84.
Designed for fourth through ninth graders, The Factory teaches real problem solving skills in a challenging way. \$24.95.

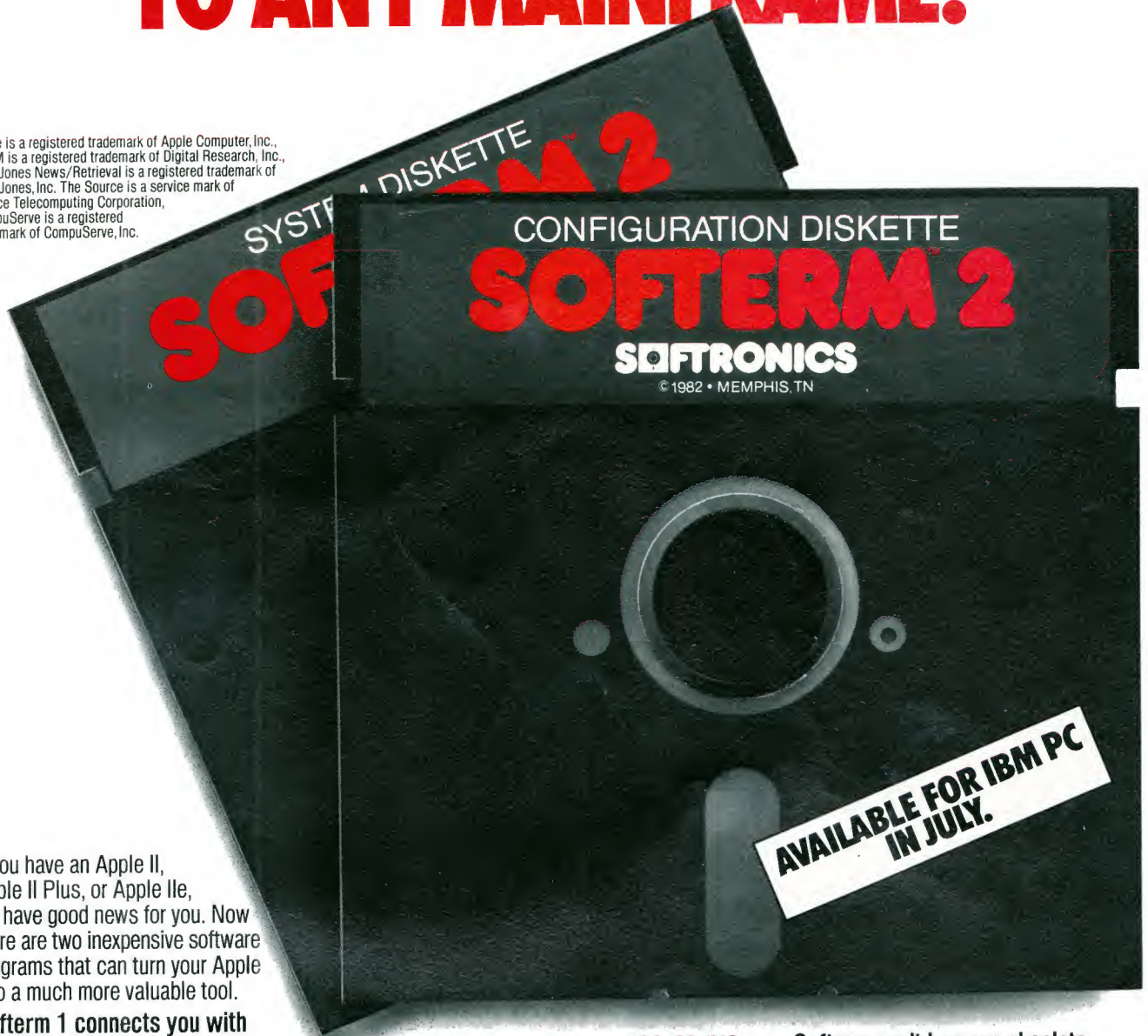
The Graphics Magician

★★★

Penguin Software, P.O. Box 311, Geneva, IL 60134
Graphics, June '84.
A great graphics utility for the Apple. No wonder so many professional game designers use it. \$59.95.

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Business graphics, March '84.
Chart your way to the top with this graphics package for the Apple III. \$199.

Gruds in Space

★ ★

Sirius Software, Inc., 10364 Rockingham Drive, Sacramento, CA 95827
Adventure game, June '84.
Saving the universe can be a chore. A game where all is not what it seems. \$39.95.

Gutenberg Jr.

★ ★

Micromation Limited, 1 Yorkdale Road, STE 406, Toronto, Ontario, Canada M6A 3A1
Word processor, June '84.
A powerful and inexpensive program for combining text and graphics. Limited in the hardware it supports. \$85.

Homeword

★ ★

Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614
Word processor, July '84.
The use of icons makes this inexpensive package easy for beginners to understand. \$69.95.

In Search of the Most Amazing Thing

★ ★ ★

Spinnaker Software, 215 First Street, Cambridge, MA 02142
Education, June '84.
An adventure game for children that helps develop reasoning skills and which de-emphasizes violence. \$39.95.

In-The-Mail

★ ★

el Dorado Software, 350 7th Avenue, Suite 324, San Francisco, CA 94118
Business, July '84.
In-The-Mail gives you 99 different letters for all those times when you can't think of what to write. From sympa-

thy notes to letters of resignation, this package has them all. \$60.

IQ Baseball

★ ★

Davka Corporation, 845 North Michigan Avenue, Chicago, IL 60611
Strategy game, May '84.
Baseball trivia fans will eat this one up. So who was the only pitcher to appear in 1000 games? \$24.95.

Jeepers Creatures

★ ★

Kangaroo, Inc., 332 S. Michigan Avenue, Suite 700, Chicago, IL 60604
Education, July '84.
A program for preschoolers that lets kids be creative while practicing word recognition and association. \$34.95.

Jenny of the Prairie

★ ★

Addison-Wesley Publishing Company, Jacob Way, Reading, MA 01867

Adventure game, August '84.
You take the part of the "plucky pioneer girl" and try to survive the harsh prairie winter. \$39.95.

Kidwriter

★ ★ ★

Spinnaker Software, 215 First Street, Cambridge, MA 02142
Education, July '84.
A good reason why Spinnaker has a reputation for excellence. This program lets young kids create pictures and then write short stories to accompany them. \$34.95.

Lancaster

★ ★

Silicon Valley Systems, 1625 El Camino Real, Belmont, CA 94002
Arcade game, April '84.
Bubble blowing space bugs threaten the Earth!!! You are humanity's only hope!!! Oh well, better luck next time. \$29.95.

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Strategy game, March '84.

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Letters and Words

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Learning Well/Methods and Solutions, Inc., 200 S. Service Road, Roslyn Heights, NY 11577

Education, July '84.

Games for preschoolers that teach alphabet sequencing, upper/lowercase association, and word/object association. \$49.95.

Lode Runner

★★★

Broderbund Software, 17 Paul Drive, San Rafael, CA 94903

Adventure game, April '84.

You hated them in Star Blazer, you loathed them in Choplifter. Well, the Bunglings are back! Apple Panic was never this much fun. \$34.95.

Magic Memory

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Artsci, Inc., 5547 Satsuma Avenue, North Hollywood, CA 91601

Data base, June '84.

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Masquerade

★★★

Phoenix Software, Inc., 64 Lake Zurich Drive, Lake Zurich, IL 60047

Adventure game, July '84.

This hi-res game features a wonderful collection of characters and a bewildering array of puzzles that you must solve before you can unmask that arch-criminal, Mr. Topp. \$34.95.

Micro-Math

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Hayden Software, 600 Suffolk Street, Lowell, MA 01853

Education, April '84.

Four basic math packages for ages 4-10. Good graphics and color. \$29.95.

Microzine

★★

Scholastic Wizware, 730 Broadway, New York, NY 10003

Education, June '84.

A disk magazine from the publishers of *Scholastic*. More fun than flipping pages. \$39.95.

Murder by the Dozen

★★★

CBS Software, One Fawcett Place, Greenwich, CT 06836

Strategy game, August '84.

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North Atlantic '86

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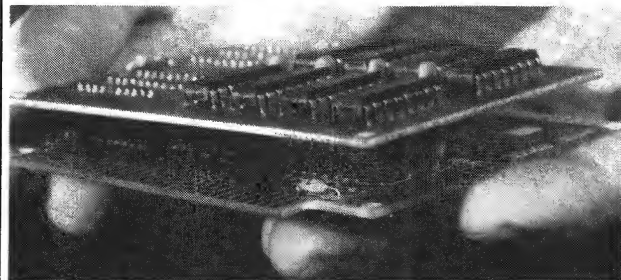
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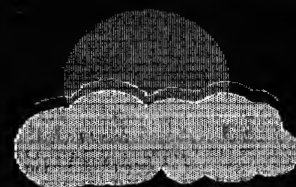
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Calcsop, Inc., Box 1231, West Caldwell, NJ 07007
Personal finance, May '84.
Make a killing in the market with this option analysis program. \$250.

Paper Graphics

★★★

Penguin Software, P.O. Box 311, Geneva, IL 60134
Graphics, July '84.
This package lets you print the contents of the Apple hires screens. As an added bonus, you can edit the pictures before you print them. \$49.95.

Pen-Pal

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Howard W. Sams and Company, 4300 W. 62nd Street, Indianapolis, IN 46202
Word processor, April '84.
Inexpensive, and designed for basic letter writing. Easy to learn but not too powerful. \$59.95.

Pentapus

★★★

Turning Point Software, 11A Main Street, Watertown, MA 02172
Arcade game, April '84.
If you're sick and tired of being kicked around by multi-appendaged aliens, then this game is for you. \$29.95.

PFS:Write

★★★

Software Publishing Corporation, 2021 Landings Drive, Mountain View, CA 94043
Word processor, April '84.
(Fermentations)
Easy to use, and with most of the functions a word processor needs. A great value. \$125.

Piracy Proof

★★★

Kane Computing, 184 Pine Brook Boulevard, New Rochelle, NY 10804
Utility, March '84.
No one will ever come up with a foolproof software protection scheme, but Kane Computing comes close. \$250.

Planetfall

★★★

Infocom, Inc., 55 Wheeler Street, Cambridge, MA 02138
Adventure game, August '84.
With Floyd as your boon companion, you'll set out to unravel the mysteries of the lost civilization. Success depends upon your wits and imagination. \$49.95.

Plasmania

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Sirius Software, 10364 Rockingham Drive, Sacramento, CA 95827
Arcade game, March '84.
Ready for a Fantastic Voyage? Here is a real inside look into vascular surgery. \$34.95.

Portfolio

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Flexible Software, 134-10 Ivy Drive, Charlottesville, VA 22901
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So you don't have the money to invest in the market? The thrill of investing without the risk. \$64.95.

Sammy Lightfoot

★★★


Sierra On-Line, Inc., Sierra On-Line Building, Coarsegold, CA 93614
Arcade game, March '84.
A fun game featuring the ups and downs of the circus life. Oh, those daring young men! \$29.95.

Sargon III

★★★

Hayden Software, 600 Suffolk Street, Lowell, MA 01853
Strategy game, August '84.
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Speed Reader II

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Davidson & Associates, 6069 Groveoak Place, #12, Rancho Palos Verdes, CA 90274

Education, June '84.

Increased productivity is the goal of this software. A good alternative to expensive speed reading courses. \$69.95.

Stellar 7

★★★

Software Entertainment Co., 537 Willamette, Eugene, OR 97401

Arcade game, April '84.

Beautiful 3-D graphics and plenty of action make this hunt for the evil emperor Gir Draxon an instant classic. \$34.95.

Stickybear Opposites

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Weekly Reader Family Software, 245 Long Hill Road, Middletown, CT 06457

Education, August '84.

Colorful graphics teach kids word opposites. For three- to six-year-olds. \$39.95.

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Teleware, Box 729, 28 Bloomfield Avenue, Pine Brook, NJ 07058

Communications, March '84.

A specialized package that automatically pulls quotes from the Dow Jones News/Retrieval Service. \$195.

Term Exec 1.2

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Exec Software, 201 Waltham Street, Lexington, MA 02173

Communications, June '84.

A sophisticated yet low cost communications package for the Apple. Sometimes hard to use, but worth the bother. \$79.95.

Think Tank

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Living Videotext, Palo Alto, CA 94306

Idea processor, April '84.

Not just a word processor, this program will help keep your thoughts straight. \$150.

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Microcomputer Games, Inc., 4517 Hartford Road, Baltimore, MD 21214

Simulation game, August '84.

An excellent sports simulation. Have fun making chip shots with your computer! \$30.

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Sierra On-Line, Inc., Sierra On-Line Building, Coarsegold, CA 93614

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A game for children 9 and over. What kid doesn't want the chance to become an Honorary Dwarf? \$29.95.

Tycoon

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Blue Chip Software, 6744 Eton Avenue, Canoga Park, CA 91303

Strategy game, April '84.

A realistic commodity market simulation game. Money doesn't grow on trees, but in soybean fields. \$59.95.

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Encounter

★★★

Ibidinc, 179 Allyn Street, Suite 607, Hartford, CT 06103

Adventure game, July '84.

A hi-res game of intrigue set in the Swiss Alps. Robert Ludlum would love this game. \$39.95.

The Witness

★★★

Infocom, Inc., 55 Wheeler Street, Cambridge, MA 02138

Text adventure, March '84.

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Circle 8 on Reader Service card.

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Random House, 201 East 50th Street, New York, NY 10022

Education, July '84.

Students in grades two through six will enjoy this reading and comprehension program. You don't have to tell them they can learn from it. \$150.

Work Force II

★★

Core Concepts, P.O. Box 24157, Tempe, AZ 85282
Home, June '84.

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Write Away

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Midwest Software Associates, 1160 Appleseed Lane, St. Louis, MO 63132

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A powerful and complete word processor. And it's fast. \$175.

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Hayden Software, 600 Suffolk Street, Lowell, MA 01853

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A solid, low-cost word processor, The Writer is a scaled down version of the popular Pie Writer by Hayden. \$49.95.

Hardware

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Amdek Corporation, 2201 Lively Boulevard, Elk Grove Village, IL 60007

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Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014

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An external modem that provides 300 and 1200 baud operation. Lots of nice features. \$495.

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Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014

Plotter, May '84.

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Silver-Reed America, Inc., 19600 S. Vermont Avenue, Torrance, CA 90502

Printer, June '84.

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Juki 6100

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Juki Industries of America, Inc., 299 Market Street, Saddle Brook, NJ 07662

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A low-cost daisy-wheel printer that features 18 cps operation. \$699.

Koala Pad

★★

Koala Technologies, 4962 El Camino Real, Suite 125, Los Altos, CA 94022

Graphics, May '84.

A low cost alternative to expensive graphics tablets. Comes with software to help you create your own graphic wonders. \$125.

L-1000

★★

Smith-Corona Consumer Products, 65 Locust Street, New Canaan, CT 06840

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inCider Magazine will be introducing a classified ad section which will begin with the October issue. Now you can bring your products and services to our market of over 110,000 Apple owners at *very* affordable rates.

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Please note we reserve the right to determine personal versus commercial placements and charges.

To place your ad contact Michele Gilmore at 800-441-4403, ext. 159.

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Password Modem

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Modem, August '84.

A 300/1200 baud external modem that is suited especially for advanced home and business communications. \$449.

Riteman Printer

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Inforunner, 1621 Stanford Street, Santa Monica, CA 90404

Printer, May '84.

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UDS 212A/D Modem

★ ★

Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805

Modem, March '84.

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V1200

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Vista Computer, 1317 Edinger, Santa Ana, CA 92705

Disk drive, April '84.

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Scott Instruments Corporation, 1111 Willow Springs Drive, Denton, TX 76205

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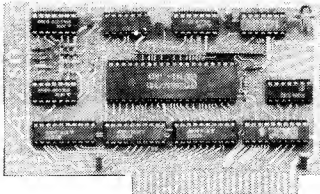
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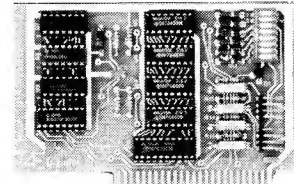
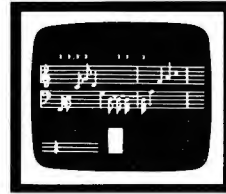
- TOTALLY compatible with ALL CP/M software.
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SUPRTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	NO	YES	NO	YES	YES	NO	YES

The VIEWMASTER 80 works with all 80 column applications including CP/M, Pascal, WordStar, Format II, Easywriter, Apple Writer II, VisiCalc, and all others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

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Hypnosis

by Lawrence J. Swan

I typed in a few of the short graphics programs from the November 1983 issue of *inCider* and thoroughly enjoyed them. I was surprised that none of these programs used shape routines, since shapes can easily be manipulated on the screen. To fill the gap, I wrote Iridescent Eddy. It uses a simple shape routine, which defines a square. The program draws three squares, each centered at 140,90. These squares are then rotated, and their scales and colors

changed for a kaleidoscope effect.

One word of caution: Take care not

to watch these graphics too long. I have found them hypnotic. ■

Program listing. Iridescent Eddy.

```
1 REM IRIDESCENT EDDY
2 REM BY L J SWAN
10 FOR N = 768 TO 777: READ I: POKE N,I: NEXT I: POKE 232,0: POKE 233,3
20 DATA 1,0,4,0,58,36,45,54,7,0
30 HGR2
40 HCOLOR= RND (1) * 6 + 1
50 FOR S = 20 TO 50
60 FOR N = 0 TO 16 STEP 2
70 ROT= N: SCALE= S: DRAW 1 AT 140,90
80 SCALE= 51 - S: XDRAW 1 AT 140,90
90 SCALE= S - 10: XDRAW 1 AT 140,90
100 NEXT N: NEXT S
110 GOTO 40
```

You can write to Lawrence J. Swan at 925 Maclay Drive, San Jose, CA 95123.

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Fudging Apple Sounds

This month I'll help you overcome any uncertainties you may have about producing sounds with your Apple. Now, I realize you may have already glanced at the listings in this column and spotted the words "machine language" in the text, but don't panic! The only requirement for producing the sounds I present is being able to type! You needn't understand anything about machine language or even BASIC. I'll tell you what listings to use for what sounds, then you just type in and save the ones you want.

The Machine Language Advantage

A normal Apple has a speaker; clicking that speaker produces sounds. If you click the speaker in an Applesoft FOR...NEXT loop, you get a buzz. The speaker's memory address from BASIC is -16336 (hex \$C030 from machine language), so a loop such as FOR Q=1 TO 8: P=PEEK(-16336): NEXT will produce a short buzz. Change the 8 to 80 for a long buzz.

But, so much for BASIC sounds—they're a bit limited, as you can see (and hear, if you try the above algorithm).

By using machine language for sound creation, we're essentially cutting out the Applesoft middleman. In an Applesoft algorithm, each command must be processed by the Applesoft interpreter before it can be actually carried out. Frequencies of only about 1-130 cycles per second are possible—in other words, only low buzzes.

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F U D G E I T !

Because we're normally looking for sounds of 80-8000 cycles per second, going through an interpreter is virtually hopeless. However, any of the possible notes in this range can be produced easily enough in machine language where no interpretation is necessary.

Listing 1. Catalog of sounds.

LASER(CALL2048)	L\$23
GAMEBUTTON #0 LASER(800G)!	
BOUNCE 2(CALL4993)	L\$A5
BALL	
KEYBOARD LASER FOR A	
KEYBOARD LASER	
GAMEBUTTON #0 LASER	
GAMEBUTTON #0 LASER(800G)	L\$2E
UFO LANDING(CALL2066)	L\$91
UFO LANDING2(CALL2921)	L\$A3
UFO TAKE-OFF(CALL4307)	L\$B0
UFO FLY-BY(CALL3155)	L\$9D
HOVERING UFO(CALL3462)	L\$A8
OUTER SPACE(CALL3800)	L\$A8
ZAP(CALL2832)	L\$32
LOW ZAP(CALL2275)	L\$3A
TELEPORTER BEAM(CALL2692)	L\$8B
TRACTOR BEAM(CALL4661)	L\$A5
DEATH RAY(CALL3631)	L\$A8
ATOMIZATION RAY(CALL4827)	L\$A5
EXPLOSION(CALL5472)	L\$4B
BOMBDROP(CALL3091)	L\$31
MACHINE GUN(CALL2416)	L\$35
TELEPHONE(CALL2500)	L\$46
POGHORN(CALL2571)	L\$78

Listing 2. LASER(CALL2048).

```
0800- A9 00 85 FF A9 FF 85 FE
0808- A9 00 8D 30 C0 EE 30 C0
0810- CE 30 C0 A6 FF CA D0 FD
0818- C6 FE F0 05 E6 FF 4C 08
0820- 08 60 00
```

Listing 3.

GAMEBUTTON #0 LASER(800G)!.

```
INS      JMP RRR
ST       LDA #10
          STA $FF
          LDA #1255
          STA $FE
AAA      LDA #10
          STA $C030
FFF      INC $C030
          DEC $C030
QQQ      LDX $FF
EEE      DEX
          BNE EEE
GGG      DEC $FE
          BEQ RRR
          INC $FF
          JMP AAA
RRR      BIT $C061
          BPL RRR
          JMP ST
          BRK
          BRK
          END
```

Preliminaries

Be sure to include POKE 104,64 and POKE 16384,0 in the HELLO program that runs before any of the BASIC programs in this column! The sounds are at or near the default start-of-program address (\$800), and since BASIC programs and sounds cannot reside in the same place in memory at the same time, the programs will bomb unless those POKES are done first.

The Listings

Take a look at **Listing 2**, LASER (CALL2048), then **Listing 1**, a catalog of sounds that includes LASER (CALL2048). Note the L\$23 after the **Listing 2** file title in the **Listing 1** catalog. That's the length of the LASER(CALL2048) file. Now here's how to type in and save the file:

- 1) Type CALL - 151 <return>.
- 2) You'll see an asterisk. That means you're in the monitor (from which machine language is used).
- 3) Type 800: after the asterisk. This is the address at which you'll start entering hex numbers into memory.
- 4) After the 800: type in the hex numbers, separated by one space. Your screen will look like this:

```
*800:A9 00 85 FF A9 FF 85 FE
```

Then hit return and do the same with the 808 line, the 810 line, the 818 line, and the 820 line. (You could type up to six lines full of hex numbers separated by spaces before hitting return, but there are aspects of this operation that require more understanding of what's happening.)

5) Once a file is completely typed in, hit control-C <return> and BSAVE it. You'll need a name, an address, and a length. The name is LASER (CALL2048), the address (given in the title in this case) is 2048, and the length (given in **Listing 1**) is \$23. So, BSAVE LASER(CALL2048), A2048, L\$23 <return> will save your file. To see if the BSAVE worked, type BRUN LASER(CALL2048) <return>. If you hear a laser, all is well. If not, reread the instructions and try again.

Using Machine Language Sound Files

In immediate mode you could BRUN LASER(CALL2048), or you could BLOAD LASER(CALL2048)

and then CALL2048. Or, after BLOADing, you could do a CALL - 151 and an 800G <return>. Once a file is BLOADED, you no longer have to BLOAD it before doing CALL 2048 or 800G. (See the sidebar on page 115 for an explanation of why CALL 2048 from Applesoft and 800G from the monitor are equivalent.)

Notice that I included, as part of the file name, the CALL address. This means that, once the file is BLOADED into memory, you need only CALL the address (2048) given to activate the routine.

In deferred mode, a line like 100 CALL 2048 will work fine, as long as you BLOADED the file into memory earlier in the program.

So you see, there's nothing tricky about typing, saving, or using a binary sound file, especially since the command for activating it appears right in the file's name! Okay? Let's go on.

Changing Sound Files

Incredible as it may seem, you can start with any of the sound files given and change them into other sounds, some of which won't even resemble the original! No programming knowledge is necessary. Follow a few short directions and you'll be ready to modify files till the cows come home.

Look, now, at **Listing 3**, GAME-BUTTON #0 LASER(800G)!. If you understand it, great. If not, no matter. Notice that there are several lines (2, 4, 6) that include LDA and #!. All these lines load specific decimal values into your Apple's registers. (LDX and LDY would also qualify as register-loading commands.) The numbers loaded in are 0, 255, and 0.

Now, the goal in altering files is to change some of the numbers loaded into the registers at various places in the binary sound routine. To do this, you need to know how to disassemble files.

Type BLOAD LASER(CALL2048) <return>. (I'm assuming that you've keyed that file in by now.) Next, do CALL - 151 <return> and 800L <return>. Voila! You've just disassembled LASER(CALL2048).

However, upon examining the LDA commands, you'll see #\$ after them, not #!. What gives? Well, #

means a hex value follows, while #! means a decimal value follows. Keep that in mind as we proceed.

Also, recall that I mentioned that LDY and LDX are also applicable here. The ninth line down includes LDX \$FF. Do you see why this instruction doesn't apply? It has no # before the \$.

Okay now, keep hitting L. See how your disassembly listing continues from where you left off? Type 800L again. The file is \$23 long, which means it extends from memory address \$800 to \$822, where the BRK (break) is.

Now run the laser sound with 800G <return>, then change the routine with 805:80 <return> and do 800G <return>. Your laser has become a bird chirp! Type BSAVE BIRD-CHIRP(CALL2048), A2048, L\$23 from Applesoft to save that chirp for all eternity and to use however you please.

You might be wondering at this point where the 805 came from. In the file you'll find:

0800-A9 00
0802-85 FF
0804-A9 FF

The hex number A9 is located at \$800, the 00 at \$801, the 85 at \$802, the first FF at \$803, the second A9 at \$804, and the last FF at \$805. (The latter FF is actually a hexadecimal representation of the binary number found in \$805, which is why such files are called binary, not hex.)

To enter a number into the Apple's memory by using the monitor, we typed the address, a colon, and then the hex number. So 805:80 meant that instead of \$FF (255 decimal), we decided to use \$80 (128 decimal) as the number to load into the Apple register (the accumulator, in this case). And since \$805 was the address containing this \$FF, we put a new number into \$805 with the 805:80 command. Notice that \$804 contains A9, which translates into LDA, while \$805 is the address containing the number.

But making the change via the monitor and then resaving the file isn't the only way you can invent new sounds and use them later. For instance, with the conversion tricks outlined in the sidebar you'll soon find that \$805 is decimal 2053. Sup-

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Listing 5. BALL.

```

5 REM BALL
8 SOUND = 4993
10 DS = CHR$(4): PRINT DS"BLOADBOUNCE2(CALL4993)"
12 POKE 5010,55: POKE 5014,1: POKE 5042,1: POKE 5070,
  1
15 TEXT : PRINT "USE JOYSTICK TO CHANGE DIRECTION": FOR
  Q = 1 TO 3000: NEXT
20 POKE 772,45: POKE 773,62: POKE 774,62: POKE 775,60
  : POKE 776,62: POKE 777,32: POKE 778,100: POKE 77
    9,45: POKE 780,21: POKE 781,63: POKE 782,55: POKE
    783,6: POKE 784,0
25 POKE 768,1: POKE 769,0: POKE 770,4: POKE 771,0: POKE
    232,0: POKE 233,3
30 HGR : POKE - 16302,0: HCOLOR= 3: HPL0T 0,0 TO 0,1
    91 TO 279,191 TO 279,0 TO 0,0: ROT= 0: SCALE= 1
40 X% = 99:Y% = 99: XDRAW 1 AT 99,99:OY% = 99:OX% = 99
50 I = PDL (0) / 32:I = I - 4:II = PDL (1) / 32:II =
    II - 4:X% = X% + I:Y% = Y% + II
52 IF OX% < 7 THEN X% = 3: GOSUB 80:OX% = 3:I = - I:
    CALL SOUND:X% = 7
54 IF OY% > 184 THEN Y% = 188: GOSUB 80:OY% = 188:I =
    - I: CALL SOUND:Y% = 184
56 IF OY% < 7 THEN Y% = 3: GOSUB 80:OY% = 3:II = - I
    I: CALL SOUND:Y% = 7
58 IF OX% > 272 THEN X% = 276: GOSUB 80:OX% = 276:II =
    - II: CALL SOUND:X% = 272
70 GOSUB 80: GOTO 50
80 ROT= 0: XDRAW 1 AT OX%,OY%: XDRAW 1 AT X%,Y%:OX% =
    X%:OY% = Y%: RETURN
  
```

pose you're using the laser sound (with CALL2048) in a BASIC program, and then need a bird chirp. Why not do a POKE2053,128:CALL 2048:POKE2053,255? The first command puts the new value in \$805,

the second command runs the routine, and the last command places the original \$FF back into \$805.

Now key in **Listing 4**, named BOUNCE2(CALL4993). BSAVE it with A4993,L\$A5, and type CALL

Listing 4. BOUNCE 2(CALL4993).

```

1381- A9 64 85 F9 A9 32 85
1388- FA A9 4B 85 FB A9 19 85
1390- FC A9 FF 85 FE A9 03 85
1398- FF 8D 30 C0 EE 30 C0 CE
13A0- 30 C0 A6 F9 CA D0 FD 8D
13A8- 30 C0 EE 30 C0 C6 FF D0
13B0- E8 A9 03 85 07 8D 30 C0
13B8- EE 30 C0 CE 30 C0 A4 FA
13C0- 88 D0 FD 8D 30 C0 EE 30
13C8- C0 C6 07 D0 E8 A9 03 85
13D0- 08 8D 30 C0 EE 30 C0 CE
13D8- 30 C0 A6 FB CA D0 FD 8D
13E0- 30 C0 EE 30 C0 C6 08 D0
13E8- E8 A9 03 85 07 8D 30 C0
13F0- EE 30 C0 CE 30 C0 A4 FC
13F8- 88 D0 FD 8D 30 C0 EE 30
1400- C0 C6 07 D0 E8 C6 FE F0
1408- 1B A5 F9 E9 04 85 F9 A5
1410- FA E9 04 85 FA A5 FB E9
1418- 04 85 FB A5 FC E9 04 85
1420- FC 4C 95 13 60 00
  
```

4993 to run it. It produces four long bounces. To change it to one short bounce, you must either do:

\$1392:37 (55 decimal)

\$1396:01

\$13B2:01

\$13CE:01

and BSAVE the file as a new name, or:

POKE 5010,55:POKE 5014,1:

POKE 5042,1:POKE 5070,1

from a BASIC program after BLOAD-ing BOUNCE2(CALL4993).

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QRMP-8 Ser/Par	145	
QRMMSS-8 Ser/Ser	145	
QRMP-8 Par/Ser	145	

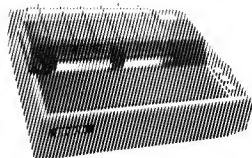
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Sound, Graphics, and Animation

Key in BALL (**Listing 5**). Notice that line 12 contains the above POKEs. (When typing XDRAW 1 AT OX%, OY%, make sure you leave spaces between AT and OX% or the computer might think you mean A TO X%, OY%.)

Run BALL once it's saved, making sure BOUNCE2(CALL4993) has been BSAVED and tested previously. Don't forget the start-of-program POKEs, and use a joystick or paddles to move the ball around. When you hit an edge you'll hear a bouncing sound. Then move your joystick in the opposite direction so you don't bounce against the wall forever.

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Listing 6. KEYBOARD LASER FOR A.

```

10 D$ = CHR$(4)
20 PRINT D$"BLOADLASER(CALL2048)"
50 PRINT "THE 'A' CHARACTER IS DEC. 65 BUT SINCE IT'
   S A KEYBOARD INPUT THE KEYBOARDSTROBE(BIT 7 = '1'
   , AND ADDS 128 TO THE BINARYOF 65) ADDS 128, SO T
   HE NEW ASCII IS 193"
100 PP = PEEK (- 16384)
110 IF PP = 193 THEN POKE - 16368,0: GOTO 130
120 GOTO 100
130 CALL 2048
140 GOTO 100

```

both sprites and sounds try Syntex's SuperSprite, Sprite II, or the Third Millenium Arcade Board. For sprites only (no sound hardware) try Krell's E-Z Color II, Commsoft's new board, or Sprite I from Syntex.

Sounds via Keyboard or Paddle Buttons

Check out **Listing 6**, KEYBOARD LASER FOR A. This routine enables

you to activate a sound by hitting a particular key, the A. See pages 138 and 139 of your *Applesoft II BASIC Programming Manual* for the ASCII codes of other keys with which to activate sound routines.

Then look at **Listing 7**, KEYBOARD LASER. Notice how PP being greater than 127 means that any key has been pressed. Finally, check out GAMEBUTTON #0 LASER, **List-**

Listing 7. KEYBOARD LASER.

```

10 D$ = CHR$(4)
20 PRINT D$"BLOADLASER(CALL2048)"
100 PP = PEEK (- 16384)
110 IF PP > 127 THEN POKE -
    16360,0: GOTO 130
120 GOTO 100
130 CALL 2048
140 GOTO 100

```

Listing 8. GAMEBUTTON #0 LASER.

```

10 D$ = CHR$(4)
20 PRINT D$"BLOADLASER(CALL2048)"
100 PP = PEEK (- 16287)
110 IF PP > 127 THEN 130
120 GOTO 100
130 CALL 2048: GOTO 100

```

Listing 9.

GAMEBUTTON #0 LASER(800G).

```

0800- 4C 24 08 A9 00 85 FF A9
0808- FF 85 FE A9 00 8D 30 C0
0810- EE 30 C0 CE 30 C0 A6 FF
0818- CA D0 FD C6 FE F0 05 E6
0820- FF 4C 0B 08 2C 61 C0 10
0828- FB 4C 03 08 00

```

Listing 10. UFO LANDING(CALL2066).

```

0824- A9 14 85 FE
0828- A9 14 85 FF A9 00 8D 30
0830- C0 EE 30 C0 CE 30 C0 A2
0838- FF CA D0 FD 8D 30 C0 EE
0840- 30 C0 CE 30 C0 C6 FF D0
0848- E3 A9 18 85 07 A9 00 8D
0850- 30 C0 EE 30 C0 CE 30 C0
0858- A0 C8 88 D0 FD 8D 30 C0
0860- EE 30 C0 CE 30 C0 C6 07
0868- D0 E3 A9 28 85 08 A9 00
0870- 8D 30 C0 EE 30 C0 CE 30
0878- C0 A2 80 CA D0 FD 8D 30
0880- C0 EE 30 C0 CE 30 C0 C6
0888- 08 D0 E3 A9 34 85 07 A9
0890- 00 8D 30 C0 EE 30 C0 CE
0898- 30 C0 A0 64 88 D0 FD 8D
08A0- 30 C0 EE 30 C0 CE 30 C0
08A8- C6 07 D0 E3 C6 FE F0 03
08B0- 4C 28 08 60 00

```

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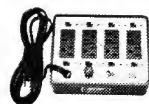
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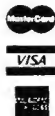
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ing 8. The only real difference between this and KEYBOARD LASER is the address we PEEK into.

Key in GAMEBUTTON #0 LASER and RUN it. Then key in the GAMEBUTTON #0 LASER (800G) binary file routine (**Listing 9**), and BRUN it after saving it. It's slightly faster than the BASIC version. The important thing about the use of machine language here is the laser sound it-

self, not the button-press detector.

You should now be able to create some pretty good sound effects in your applications. Refer to **Listings 10 through 26** for sounds not specifically mentioned in my discussion. They'll provide you plenty to work with and lots of fun. Just remember, don't use these routines when anyone else is trying to sleep!

See you next time! ■

Listing 11. UFO LANDING2(CALL2921).

```
0B69- A9 00 85 F9 A9 64 85
0B70- FA A9 40 85 FB A9 32 85
0B78- FC A9 28 85 FE A9 14 85
0B80- FF 8D 30 C0 EE 30 C0 CE
0B88- 30 C0 A6 F9 CA D0 FD 8D
0B90- 30 C0 EE 30 C0 CE 30 C0
0B98- C6 FF D0 E5 A9 18 85 07
0BA0- 8D 30 C0 EE 30 C0 CE 30
0BA8- C0 A4 FA 88 D0 FD 8D 30
0BB0- C0 EE 30 C0 CE 30 C0 C6
0BB8- 07 D0 E5 A9 28 85 08 8D
0BC0- 30 C0 EE 30 C0 CE 30 C0
0BC8- A6 FB CA D0 FD 8D 30 C0
0BD0- EE 30 C0 CE 30 C0 C6 08
0BD8- D0 E5 A9 34 85 07 8D 30
0BE0- C0 EE 30 C0 CE 30 C0 A4
0BE8- FC 88 D0 FD 8D 30 C0 EE
0BF0- 30 C0 CE 30 C0 C6 07 D0
0BF8- E5 C6 FE F0 0B E6 F9 E6
0C00- FA E6 FB E6 FC 4C 7D 0B
0C08- 60 00
```

Listing 12. UFO TAKE-OFF(CALL4307).

```
10D3- A9 02 85 FD C6
10D8- F9 C6 FA C6 FB C6 FC C6
10E0- FD D0 01 60 A9 C8 85 F9
10E8- A9 AF 85 FA A9 96 85 FB
10F0- A9 7D 85 FC A9 64 85 FE
10F8- A9 0F 85 FF A9 00 8D 30
1100- C0 EE 30 C0 CE 30 C0 A6
1108- F9 CA D0 FD 8D 30 C0 EE
1110- 30 C0 C6 FF D0 E6 A9 18
1118- 85 07 A9 00 8D 30 C0 EE
1120- 30 C0 CE 30 C0 A4 FA 88
1128- D0 FD 8D 30 C0 EE 30 C0
1130- C6 07 D0 E6 A9 28 85 08
1138- A9 00 8D 30 C0 EE 30 C0
1140- CE 30 C0 A6 FB CA D0 FD
1148- 8D 30 C0 EE 30 C0 C6 08
1150- D0 E6 A9 34 85 07 A9 00
1158- 8D 30 C0 EE 30 C0 CE 30
1160- C0 A4 FC 88 D0 FD 8D 30
1168- C0 EE 30 C0 C6 07 D0 E6
1170- C6 FE F0 0B C6 F9 C6 FA
1178- C6 FB C6 FC 4C F8 10 4C
1180- D7 10 00
```

Listing 13. UFO FLY-BY(CALL3155).

```
0C3F- A9
0C40- 32 85 F9 A9 28 85 FA A9
0C48- 20 85 FB A9 1B 85 FC A9
0C50- 28 85 FE A9 14 85 FF A9
0C58- 00 8D 30 C0 EE 30 C0 CE
0C60- 30 C0 A6 F9 CA D0 FD 8D
0C68- 30 C0 EE 30 C0 C6 FF D0
0C70- E6 A9 18 85 07 A9 00 8D
0C78- 30 C0 EE 30 C0 CE 30 C0
0C80- A4 FA 88 D0 FD 8D 30 C0
0C88- EE 30 C0 C6 07 D0 E6 A9
0C90- 28 85 08 A9 00 8D 30 C0
0C98- EE 30 C0 CE 30 C0 A6 FB
0CA0- CA D0 FD 8D 30 C0 EE 30
0CA8- C0 C6 08 D0 E6 A9 34 85
0CB0- 07 A9 00 8D 30 C0 EE 30
0CB8- C0 CE 30 C0 A4 FC 88 D0
0CC0- FD 8D 30 C0 EE 30 C0 C6
0CC8- 07 D0 E6 C6 FE F0 0B E6
0CD0- F9 E6 FA E6 FB E6 FC 4C
0CD8- 53 0C 60 00
```

Listing 14. HOVERING UFO(CALL3462).

```
0D86- A9 28
0D88- 85 FD C6 FD D0 01 60 A9
0D90- 0F 85 F9 A9 0C 85 FA A9
0D98- 09 85 FB A9 2D 85 FC A9
0DA0- 05 85 FE A9 20 85 FF A9
0DA8- 00 8D 30 C0 EE 30 C0 CE
0DB0- 30 C0 A6 F9 CA D0 FD 8D
0DB8- 30 C0 EE 30 C0 C6 FF D0
0DC0- E6 A9 18 85 07 A9 00 8D
0DC8- 30 C0 CE 30 C0 CE 30 C0
0DD0- A4 FA 88 D0 FD 8D 30 C0
0DD8- EE 30 C0 C6 07 D0 E6 A9
0DE0- 28 85 08 A9 00 8D 30 C0
0DE8- EE 30 C0 CE 30 C0 A6 FB
0DF0- CA D0 FD 8D 30 C0 EE 30
0DF8- C0 C6 08 D0 E6 A9 34 85
0E00- 07 A9 00 8D 30 C0 EE 30
0E08- C0 CE 30 C0 A4 FC 88 D0
0E10- FD 8D 30 C0 EE 30 C0 C6
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0E28- A3 0D 4C 8A 0D 00
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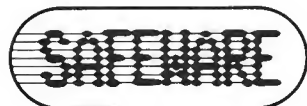
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Listing 15.
OUTER SPACE(CALL3800).

```

0ED8- A9 0A 85 FD C6 FD D0 01
0EE0- 60 A9 64 85 F9 A9 50 85
0EE8- FA A9 3C 85 FB A9 28 85
0EF0- FC A9 08 85 FE A9 08 85
0EF8- FF A9 00 8D 30 C0 EE 30
0F00- C0 CE 30 C0 A6 F9 CA D0
0F08- FD 8D 30 C0 EE 30 C0 C6
0F10- FF D0 E6 A9 18 85 07 A9
0F18- 00 8D 30 C0 EE 30 C0 CE
0F20- 30 C0 A4 FA 88 D0 FD 8D
0F28- 30 C0 EE 30 C0 C6 07 D0
0F30- E6 A9 28 85 08 A9 00 8D
0F38- 30 C0 EE 30 C0 CE 30 C0
0F40- A6 FB CA D0 FD 8D 30 C0
0F48- EE 30 C0 C6 08 D0 E6 A9
0F50- 34 85 07 A9 00 8D 30 C0
0F58- EE 30 C0 CE 30 C0 A4 FC
0F60- 88 D0 FD 8D 30 C0 EE 30
0F68- C0 C6 07 D0 E6 C6 FE F0
0F70- 0B C6 F9 C6 FA C6 FB C6
0F78- FC 4C F5 0E 4C DC 0E 00

```

Listing 16. ZAP(CALL2832).

```

0B16- 20 1F
0B18- 0B 20 1F 0B 20 1F 0B A9
0B20- 00 85 FF A9 80 85 FE A9
0B28- 00 8D 30 C0 EE 30 C0 CE
0B30- 30 C0 A6 FF CA D0 FD C6
0B38- FE F0 05 E6 FF 4C 27 0B
0B40- 60 00

```

Listing 17. LOW ZAP(CALL2275).

```

08E3- 20 FB 08 20 FB
08E8- 08 20 FB 08 20 FB 08 20
08F0- FB 08 20 FB 08 20 FB 08
08F8- 20 FB 08 A9 64 85 FF A9
0900- 5F 85 FE A9 00 8D 30 C0
0908- EE 30 C0 CE 30 C0 A6 FF
0910- CA D0 FD C6 FE F0 05 E6
0918- FF 4C 03 09 60

```

Listing 18.
TELEPORTER BEAM(CALL2692).

```

0A84- A9 14 85 FE
0A88- A9 14 85 FF 8D 30 C0 EE
0A90- 30 C0 CE 30 C0 A2 80 CA
0A98- D0 FD 8D 30 C0 EE 30 C0
0AA0- CE 30 C0 C6 FF D0 E5 A9
0AA8- 18 85 07 8D 30 C0 EE 30
0AB0- C0 CE 30 C0 A0 64 88 D0
0AB8- FD 8D 30 C0 EE 30 C0 CE
0AC0- 30 C0 C6 07 D0 E5 A9 28
0AC8- 85 08 8D 30 C0 EE 30 C0
0AD0- CE 30 C0 A2 40 CA D0 FD
0AD8- 8D 30 C0 EE 30 C0 CE 30
0AE0- C0 C6 08 D0 E5 A9 34 85
0AE8- 07 8D 30 C0 EE 30 C0 CE
0AF0- 30 C0 A0 32 88 D0 FD 8D
0AF8- 30 C0 EE 30 C0 CE 30 C0
0B00- C6 07 D0 E5 C6 FE F0 03
0B08- 4C 88 0A 60 00

```

Listing 19.
TRACTOR BEAM(CALL4661).

```

1235- A9 FF 85
1238- F9 A9 9B 85 FA A9 C8 85
1240- FB A9 64 85 FC A9 6E 85
1248- FE A9 05 85 FF 8D 30 C0
1250- EE 30 C0 CE 30 C0 A6 F9
1258- CA D0 FD 8D 30 C0 EE 30
1260- C0 C6 FF D0 E8 A9 06 85
1268- 07 8D 30 C0 EE 30 C0 CE
1270- 30 C0 A4 FA 88 D0 FD 8D
1278- 30 C0 EE 30 C0 C6 07 D0
1280- E8 A9 09 85 08 8D 30 C0
1288- FE 30 C0 CE 30 C0 A6 FB
1290- CA D0 FD 8D 30 C0 EE 30
1298- C0 C6 08 D0 E8 A9 0D 85
12A0- 07 8D 30 C0 EE 30 C0 CE
12A8- 30 C0 A4 FC 88 D0 FD 8D
12B0- 30 C0 EE 30 C0 C6 07 D0
12B8- E8 C6 FE F0 1B A5 F9 E9
12C0- 0A 85 F9 A5 FA E9 0A 85
12C8- FA A5 FB E9 0A 85 FB A5
12D0- FC E9 0A 85 FC 4C 49 12
12DB- 60 00

```

Hex-Dec and Dec-Hex Conversions

In our discussion you may have noticed that \$800 and 2048 are equivalent numbers. The first is in hexadecimal, the second is in decimal. 800G is code for "start at \$800 and GO" just as CALL 2048 means "begin at 2048, run the routine, and return." Here's a convenient way to convert back and forth between hex and decimal numbers.

Using our example, if you want to figure the decimal equivalent of \$800, turn it into a four-digit number (0800), separate it into halves (08 00), reverse it (00 80), and employ it in the command 75:00 08 NED20G <return> after using CALL - 151 to enter the monitor. Your result will be 2048.

To determine the hexadecimal equivalent of 2048, type NEW <return> and 2048A <return>. Then use CALL - 151 to enter the monitor and type 803.804 <return>. You'll see 0803- 00 08, which includes a backwards version of \$800. Turn it into 08 00 first, then 0800, then \$800, just the reverse of the hex-dec conversion.

Note that 803.804 works only if ?PEEK(104) produces 8. If the PEEK produces 64 or 96, use 4003.4004 or 6003.6004, respectively. For other numbers, divide by 16 and add a 0, then append 03 or 04, if possible. □

Listing 20.
DEATH RAY(CALL3631).

```

0E2F- A9
0E30- 0A 85 FD C6 FD D0 01 60
0E38- A9 28 85 F9 A9 25 85 FA
0E40- A9 22 85 FB A9 1F 85 FC
0E48- A9 05 85 FE A9 14 85 FF
0E50- A9 00 8D 30 C0 EE 30 C0
0E58- CE 30 C0 A6 F9 CA D0 FD
0E60- 8D 30 C0 EE 30 C0 C6 FF
0E68- D0 E6 A9 18 85 07 A9 00
0E70- 8D 30 C0 EE 30 C0 CE 30
0E78- C0 A4 FA 88 D0 FD 8D 30
0E80- C0 EE 30 C0 C6 07 D0 E6
0E88- A9 28 85 08 A9 00 8D 30
0E90- C0 EE 30 C0 CE 30 C0 A6
0E98- FB CA D0 FD 8D 30 C0 EE
0EA0- 30 C0 C6 08 D0 E6 A9 34
0EA8- 85 07 A9 00 8D 30 C0 EE
0EB0- 30 C0 CE 30 C0 A4 FC 8B
0EB8- D0 FD 8D 30 C0 EE 30 C0
0EC0- C6 07 D0 E6 C6 FE F0 0B
0EC8- C6 F9 C6 FA C6 FB C6 FC
0ED0- 4C 4C 0E 4C 33 0E 00

```



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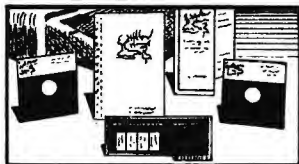
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Listing 21.

ATOMIZATION RAY(CALL4827).

```
12DB- A9 FF 85 F9 A9
12EB- 9B 85 FA A9 C8 85 FB A9
12EB- 64 85 FC A9 FF 85 FE A9
12F0- 06 85 FF 8D 30 C0 EE 30
12F8- C0 CE 30 C0 A6 F9 CA D0
1300- FD 8D 30 C0 EE 30 C0 C6
1308- FF D0 EB A9 06 85 07 8D
1310- 30 C0 EE 30 C0 CE 30 C0
1318- A4 FA 88 D0 FD 8D 30 C0
1320- EE 30 C0 C6 07 D0 E8 A9
1328- 06 85 08 8D 30 C0 EE 30
1330- C0 CE 30 C0 A6 FB CA D0
1338- FD 8D 30 C0 EE 30 C0 C6
1340- 08 D0 E8 A9 06 85 07 8D
1348- 30 C0 EE 30 C0 CE 30 C0
1350- A4 FC 88 D0 FD 8D 30 C0
1358- EE 30 C0 C6 07 D0 E8 C6
1360- FE F0 1B A5 F9 E9 0A 85
1368- F9 A5 FA E9 0A 85 FA A5
1370- FB E9 0A 85 FB A5 FC E9
1378- 0A 85 FC 4C EF 12 60 00
```

Listing 22. EXPLOSION(CALL5472).

```
1560- A9 07 85 06 A0 00 A9 09
1568- 85 FE A9 00 8D 30 C0 EE
1570- 30 C0 CE 30 C0 A2 FF CA
1578- D0 FD A2 FF CA D0 FD A2
1580- FF CA D0 FD B6 21 C8 CA
1588- D0 FD B6 21 CA D0 FD B6
1590- 21 CA D0 FD B6 21 CA D0
1598- FD C6 FE F0 03 4C 6A 15
15A0- A9 45 20 A8 FC C6 06 D0
15AB- BD 60 00 00
```

Listing 23. BOMBDROP(CALL3091).

```
0C13- A9 00 85 FF A9
0C18- FF 85 FE A9 00 8D 30 C0
0C20- EE 30 C0 CE 30 C0 A0 05
0C28- A6 FF CA D0 FD 88 F0 03
0C30- 4C 28 0C C6 FE F0 05 E6
0C38- FF 4C 1B 0C 60 00
```

Listing 24.

MACHINE GUN(CALL2416).

```
0970- 20 82 09 20 82 09 20 82
0978- 09 20 82 09 20 82 09 20
0980- 82 09 A9 FF 85 FF A9 9B
0988- 85 FE A9 00 8D 30 C0 EE
0990- 30 C0 CE 30 C0 A6 FF CA
0998- D0 FD C6 FE F0 05 E6 FF
09A0- 4C 8A 09 60 00
```

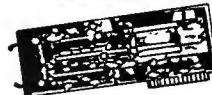
Listing 25. TELEPHONE(CALL2500).

```
09C4- A9 14 85 FE
09C8- A9 14 85 FF A9 00 8D 30
09D0- C0 EE 30 C0 CE 30 C0 A2
09D8- A0 CA D0 FD 8D 30 C0 EE
09E0- 30 C0 C6 FF D0 E6 A9 14
09E8- 85 07 A9 00 8D 30 C0 EE
09F0- 30 C0 A0 C8 88 D0 FD 8D
09F8- 30 C0 EE 30 C0 C6 07 D0
0A00- E9 C6 FE F0 03 4C C8 09
0A08- 60 00
```

Listing 26. FOGHORN(CALL2571).

```
0A0B- A9 FF 85 FE A9
0A10- 00 8D 30 C0 EE 30 C0 CE
0A18- 30 C0 A2 FF CA D0 FD 8C
0A20- 30 C0 EE 30 C0 CE 30 C0
0A28- A0 FE 88 D0 FD 8D 30 C0
0A30- EE 30 C0 CE 30 C0 A9 FD
0A38- 85 07 C6 07 D0 FC 8D 30
0A40- C0 EE 30 C0 CE 30 C0 A9
0A48- FC 85 08 C6 08 D0 FC 8D
0A50- 30 C0 EE 30 C0 CE 30 C0
0A58- A9 FB 85 09 C6 09 D0 FC
0A60- 8D 30 C0 EE 30 C0 CE 30
0A68- C0 A9 FA 85 06 C6 06 D0
0A70- FC 8D 30 C0 EE 30 C0 CE
0A78- 30 C0 C6 FE F0 03 4C 0F
0A80- 0A 60 00 3A
```

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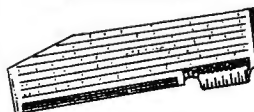
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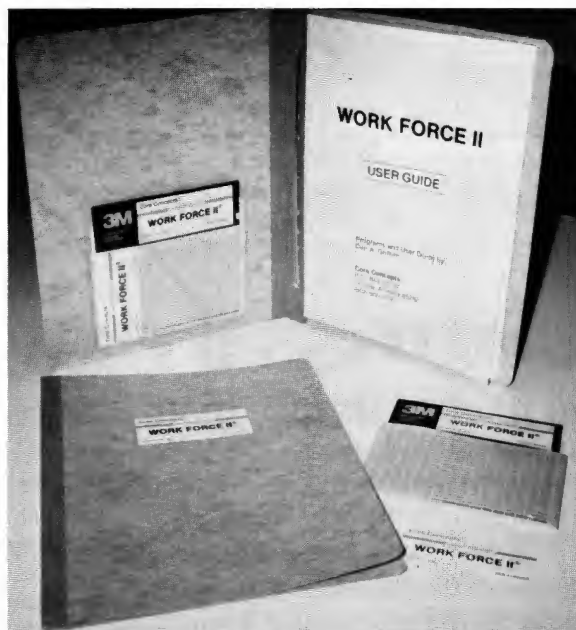
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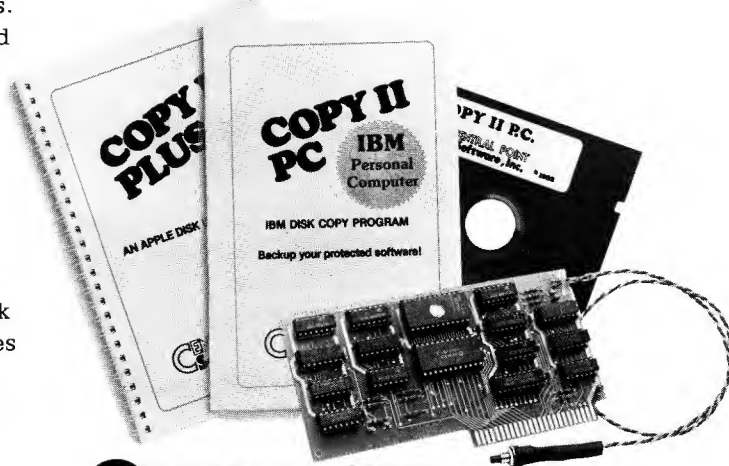
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Bob Ryan, our residential technical editor with all the answers, ponders your queries about Apple computing. If you have a question or a comment, write to Ask inCider, 80 Pine Street, Peterborough, NH 03458.

Integer BASIC Revisited

Dear Bob:

You had a letter in the July issue from someone wanting to know about Integer BASIC. I recently reviewed a book for *Microcomputing* (April '84) that may be of interest. It's called *Intermediate Level Apple II Handbook*, by David Heiserman. It's published by Howard W. Sams & Co., 4300 West 62nd Street, Indianapolis, IN 46268, at \$16.95.

Best regards.

Greg Glau
P.O. Box 1627
Prescott, AZ 86302

Dear Greg:

Thanks for the information. It's nice to know that folks who write the magazine also read it.

Richard Hausman, a reader from Alameda, CA, also recommends "Intermediate Level Apple II Handbook." He thinks that it is the most thorough and clearly written book on the subject.

Dear Bob:

Thanks for an interesting column. I'd like to comment on your reply to Jeff Bruno in the July *inCider*. The *Apple II User's Guide* by Lon Poole with Martin McNiff and Steven Cook, published by Osborne/McGraw-Hill, is another book that can be used as an Integer BASIC reference. This book and its successor, *Apple II User's Guide for the Apple II Plus and Apple //e*, are references that I think every Apple owner should have on hand.

I also had to chuckle when I read Chip Uhn's letter and his reference to CARROT (CARET)!

That's not the first time I've seen them mixed up! A widely distributed amateur radio RTTY/CW package bore several references to that umbelliferous plant. The occurrence of that misspelling can be traced to the wishful thinking of a hungry, dieting programmer!

Paul K. Pagel, N1FB
4 Roberts Road
Enfield, CT 06082

Dear Paul:

Thanks for the letter, and thanks for the new word! Umbelliferous is the latest addition to my vocabulary. (I won't spoil everyone's fun by revealing what it means. After all, you can look it up as well as I can.)

Model 100 Mix and Match

Dear *inCider*:

I recently purchased a TRS-80 Model 100 from Radio Shack. I have also been a dedicated Apple II Plus owner for the past two years. The faculty and staff at the Department of Medicine use Apples for a number of functions. I would like to know if I can interface the Model 100 with my Apple and with my Imagewriter printer. I am also looking for a small, battery operated printer to complement the Model 100. Any suggestions?

Maurice A. Mufson, M.D.
Professor and Chairman
Marshall University
School of Medicine
Huntington, WV 25701

Dear Maurice:

We've also got a number of Model 100s lying about here at CWCI/Peterborough, so your letter spurred an investigation that I had been meaning to undertake for a long time. Up to now, I've only used a Model 100 when travelling. I'd dial up CompuServe or The Source and dump a file there which would then be retrieved by someone back at the office. I'm happy to report that you won't have

to go through that bother. You can connect your Apple directly to your Model 100. You will need an RS-232C serial interface card in your Apple, an RS-232C cable, and a null modem adapter. You can purchase a null modem adapter direct from Radio Shack (catalog #26-1496).

Once you have the two computers connected, you will need communications software for your Apple to control file transfers. I found that by using Access II communications software from Apple in Terminal mode, I was able to transfer data from the Model 100. If you use Access II, remember that you will have to use the Record a File option instead of the Receive a File. That's because the Model 100 uses XON/XOFF protocol instead of Christensen. Note also that Access II produces ProDOS formatted text files.

This is just fine for me because I use AppleWorks, but you may want to investigate communications software that produces DOS text files.

I have yet to get the Model 100 to work properly with an Imagewriter. If you use the Model 100's printer port, you have to get a parallel to serial converter. I am going to try printing through the modem port. I'll let you know how it goes.

Finally, I don't know of any portable printer that will fit your needs but I suspect that with the flood of portable computers being introduced this year, it will not be long before we are inundated with portable peripherals.

Contemplating Templates

Dear *inCider*:

I have heard that someone is making keyboard templates that have software commands on them. I would like to obtain templates for Applewriter II and VisiCalc. I own an Apple //e. Do you have any information on this?

Anthony Bartkus
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SC-100 Color	249.00
SC-200 RGB Color	459.00
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Dear Anthony:

Keyboard templates as you describe them are indeed available for the Apple. They are made by a company called Creative Computer Products. You can reach them at P.O. Box 85151-MB 134, San Diego, CA 92138.

Ever Try Denmark?

Dear *inCider*:

I am writing to ask if you know where I might be able to obtain hardware and software for an Apple II Plus to operate and control a fish nursery. I am very interested in any information about setting up and operating computerized fish farms/nurseries. Can you recommend any publications on this or related subjects?

Joseph G. Bloechi
P.O. Box 7137
APO NY 09282

Dear Joseph:

Sorry, but I draw a blank on this one. Hopefully, one of *inCider*'s readers will come to the rescue. How about it, folks?

Where's the RAM?

Dear *inCider*:

Several months ago, I purchased ProDOS, Apple's latest operating system for Apple II computers. My problem is that I cannot obtain a 16K RAM card that I need in order to use ProDOS. My dealer keeps saying it is impossible to find a 16K RAM card. Can you help?

Peter Engelmeyer
Box 83
Foley, MN 56329

Dear Peter:

Contrary to what your dealer says, you can still find 16K RAM cards for older Apples. Just check out the ads from mail order houses in any computer magazine, *inCider* included.

You should be able to come up with a couple of places that are still selling 16K RAM cards for the Apple.

By the way, I would advise all Apple owners to upgrade their machines to 64K. A lot of software coming out these days will not fit into 48K.

Bulletin Board Update

Well folks, the phone company has come through and we now have a dedicated phone line installed for our bulletin board. The phone number is (603) 924-9801. We will inaugurate 24-hour service on September 15. So if you want to download some of the more popular programs that have appeared in *inCider*, give us a call. Our feature program for the first month will be Joel Davis' blockbuster simulation game, "Presidential Power," that was published in the March '84 *inCider*. Now you can get it (without all that typing) in time to run your own November election. See you next time. ■

Circle 353 on Reader Service card.



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*It works with all the following word processors, with owners of trademarks indicated in parentheses: DOS 3.2 & DOS 3.3 - AppleWorks & AppleWriter, all versions (Apple Computer, Inc.); Bank Street Writer, Format II (Brodebund); HomeWord and Screen Writer (Sierra On-Line Inc.); Word Handler (Silicon Valley Systems); CP/M - Wordstar (Digital Research Corp. - Micropro International); PFS: WRITE (Software Publishing, Inc.); and others. All features are not available with CP/M, PFS: WRITE and Word Handler.

- *Is Apple wormy?*
- *Down in the dumps*
- *Heat wave*

QI refer to the letter from R. Alekshun (March '84, page 124) concerning customer service from Apple. I purchased my first computer from Apple in 1976 and three computers later I can report that I have never been able to get any parts, not even a speaker plug, from Apple or any of their dealers. They are just not interested in helping out their customers, except on their own terms, which can be expensive.

**F. Anderson
Great Falls, MT**

As an Apple technician working at an Apple dealership where we diligently try to solve all the repair and other computer related problems our customers have, I must take exception to your remarks.

As an Apple computer user for five years in a 1200-student vocational high school with nearly 55 Apples and related equipment, I not only take exception but wonder if you might be causing the problem.

Starting in 1979 and continuing until today, I have received information for the asking from technicians in dealerships and from Apple Tech Support whenever I have asked for it. Further, I have attempted to pass on information when I was asked. To be sure, some folks are less than helpful,

and some of them work for Apple dealers or Apple, Inc. In my experience however, the vast majority of techs and sales people are exceptionally helpful. Try getting some technical information out of Big Blue; that will ruin your day.

Parts sometimes get scarce and repair departments must husband them carefully in order to keep their customers' computers going. Generally, I have been able to order parts from dealers (before I went to work for one) with few, if any, problems.

The Molex two-prong speaker plug was very difficult to find for a long while. I called all over the country for nearly three months before locating some. That's hardly Apple's fault. It was just a shortage; they are now readily available from Molex.

This is my offer to you, right here in front of my mother and all these people: Ask and you shall receive. The Apple Clinic will try to answer all your questions, but since I don't know everything about Apples (he finally admitted it!), you will be getting assistance from Apple too.

QI have been using my school's Apple Dot Matrix printer with my //e. It used the standard parallel card and cable and ran all my software with no difficulty. I decided to buy my own printer and

chose the Mannesman Tally Spirit 80 dot matrix. For the interface I chose the Apple Dumping GX.

The first time I tried Bank Street Writer the only thing that worked was the address and salutation. When it reached the body of the text, the printer just kept striking over the copy until it found a carriage return. I changed the utility in Bank Street to accept a line feed. This corrected the text problem, but it gave me double spacing in the opening of the letter.

Mannesman told me to configure the Dumping card to the MX-80 settings, but that didn't correct the problem. I took the printer and card to A.P.P.L.E. (Apple PugetSound Program Library Exchange). They checked my copy of Bank Street on their II Plus using my printer and card and all worked perfectly.

The local computer store called both their distributor and Apple's main office. None of them had heard of anyone having this problem. One

Earle Hancock directs the microcomputing project at Minuteman Regional Vocational School, Lexington, MA. He has served as an advisor to the Massachusetts Association of Vocational Administrators, and belongs to a number of computer organizations. Write to him c/o inCider, 80 Pine Street, Peterborough, NH 03458.

by Earle Hancock

of the store clerks did mention that he had heard some people had trouble with extended 80-column cards but he thought the problem had been corrected.

Since I had an extended 80-column card in slot #3 I decided to remove it and try running Bank Street. It worked beautifully! I replaced the extended 80-column card with my normal 80-column card and behold, the same problem as above. I tried Super Text with the same results. As long as I have no card in slot #3 the word processor works.

It is really inconvenient to have to move my monitor, pop the cover and remove the 80-column card every time I want to print a document. Can you help me?

P.S. A friend of mine has a //e, the Dumpling card and a Mannesman Tally 160L. He is having the same problem running his word processing programs.

**D. Beasley
Kent, WA**

A To maintain as much compatibility as possible with Apple II Plus software, designers of the Apple //e managed several bits of sleight of hand. One of the neatest is the placement of the 80-column card.

Most, if not all, Apple II Plus word processing software expects to find the 80-column card, if present, in slot #3. The Apple //e was designed to respond to that convention. Maybe that doesn't sound so fancy until you look "under the hood" of an Apple //e and see that the //e 80-column card is in a new slot called Aux and not in slot #3 at all. Yet when you type "PR#3" the 80-column card turns on and does its thing, even though slot #3 is empty. Therefore, when you say slot #3 I will assume you mean the Aux slot.

The condition you describe is most perplexing. The 80-column card and the printer or printer interface appear to be incompatible. The software packages (Bank Street and Super Text) are in wide use with many types of printers and interfaces. This is the first time I have heard of any problems of this nature associated with them. My best guess is not to suspect the software.

Further, the //e 80-column card is equally well used and no serious problems have cropped up with respect to printer compatibility. That leaves us with the printer or the interface card as the probable guilty party.

The problem lies in the way the printer or interface card handles carriage returns (CR) and line feeds (LF). Why the problem disappears when the 80-column card is removed escapes me. Maybe one of our readers knows the reason and is willing to tell. In the meantime, locate all configuration switches (DIP switches) in the printer and on the interface card. Pay close attention to those having to do with CR and LF. Try all the possible combinations, testing each carefully and noting the results. In this manner you may discover the right settings that work with the 80-column card in place.

If all else fails try another kind of interface card. Your dealer should be willing to help you with this. It is in his best interest to help you solve the puzzle so that future printer sales to Apple owners will not duplicate your situation. Make an appointment to bring in all your equipment, set it up and demonstrate the problem to him. It is not at all unreasonable to expect the printer and your Apple to print properly using the software you mentioned.

Q My Apple II has an Integer BASIC firmware card plugged in to slot #0. I also have DOS 3.3. Recently, when I switched the firmware card from Applesoft (switch up) to Integer (switch down), the switch literally fell apart. I shut the computer off, opened the cover, recovered all the parts and reassembled the switch. I'm positive that the switch is reassembled correctly. However, upon reinstalling the card in slot #0 and turning the Apple on, it came up in Applesoft without booting the disk. (I have the autostart ROM.)

Is my problem in the firmware card or somewhere else? Removing the firmware card and turning the Apple on results in a screen full of garbage. Typing PR#6 sends the computer into limbo. Typing INT results in a syntax error. Calling - 151

to enter the monitor and typing C080L results in C080— FF ??? and then C081—(limbo). I assume these locations are where Applesoft and Integer are supposed to be. Typing CTRL-B returns me to Applesoft from the monitor and I can type in short programs which will work in Applesoft.

Would you recommend the repair kit advertised in *inCider*, April 1984, p. 175? I am a retired Army electronics technician and have a scope, DMM digital probe and other test equipment of my own.

Since I live in a rural area 160 miles from the nearest Apple dealer, I rely on mail order. Should I send the whole computer (and where can I send it) to solve this problem?

**R. Dingwall
Lake Mead City, AZ**

A Using the switch on the back of an Integer BASIC card to select the language is unnecessary in a disk-based Apple. If no disk system is present, the switch will determine the BASIC at startup. Since most computers these days are disk based and since DOS selects the BASIC language based on the language of the greeting program (usually called "Hello"), the best position for the switch is down. A cold start in a disk-based system with the switch up causes the Apple to enter the monitor software (the "*" prompt). From the "monitor" you must then boot the disk with a 6 CRT-L-P. This is too inconvenient and subverts the purpose of the auto-start monitor ROM.

Once you are up and running, select the BASIC language you wish to use by typing INT for integer or FP for Applesoft. The FP stands for Floating Point, meaning that Applesoft can handle decimal numbers. Math folks will remind us that an integer is a whole number; the name Integer BASIC implies the use of whole numbers only. When you run a program, DOS automatically selects the language that the program is written in. INT and FP are DOS commands, so the Disk Operating System must be active to use them. If the language is not there, DOS prints the error message, "LANGUAGE NOT AVAILABLE".

DOS uses addresses C080 and

C081 to switch back and forth between Integer and Applesoft. Both languages reside in ROM space starting at D000.

This rather long-winded introduction does not solve your basic problem. Let's start by removing all peripheral cards from the Apple and testing it "naked". If you still get "garbage", then the first part of your problem is the main logic (mother) board. From your description I feel there is little doubt that the integer card is bad as well. Have both the MLB and the integer card checked by a dealer. Be sure to test the disk system on a "known good" computer to ensure that the drives and interface card are OK.

To get the name and phone number of the Apple dealer nearest you call 1-800-538-9696. For technical information from Apple the end user phone number in your area is 1-408-745-6731.

If you send your equipment to be repaired, be sure to pack it well. Have

plenty of "popcorn" or other shock absorbing material surrounding the parts and put your return address in several places. It helps to call ahead and direct the package to someone's attention rather than a general addressee. Include a complete description of the problem and the agreed upon method of payment.

I have not tested the repair kit you mention, although I saw the same advertisement you did. In the next few months I will obtain one of the kits and evaluate it. Keep your eyes on these pages for the results.

Q The first time my Apple is turned on when it has not been in use for a few hours, VisiCalc has a memory reading of only 24. When it has had a chance to warm up for approximately three minutes it will boot the full memory of 34. This is with a RAM card. Without the RAM card the readings will be 18 and 24 respectively. Pascal

cannot be booted until after an initial warm-up period. WordStar also often requires two boots. Everything checks out with Apple-Cillin and Apple-Cillin II, and removal of all the peripheral cards, including the Videx Enhancer, does not correct the fault. Many other programs, however, will boot normally the first time.

**J. de la Fontaine
Lakeland, FL**

A Playing hide and seek with intermittent heat-related problems can bring on premature grey hair (undoubtedly the reason for mine). One product that can help is called "cold spray". There are several trade names; all are pretty much the same.

Once your computer is warmed up and working fine, spray a small area, cooling the components down to cold-start temperatures. Then test to see if the problem has appeared. My best guess is that the higher areas of the RAM (random access memory)

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are affected. Remove the RAM card, remember to replace the missing RAM chip where the RAM card plugs into the MLB (main logic board), and test. If the problem persists, then you can eliminate the RAM card from the list of suspects (just like Snooper Troops, isn't it?).

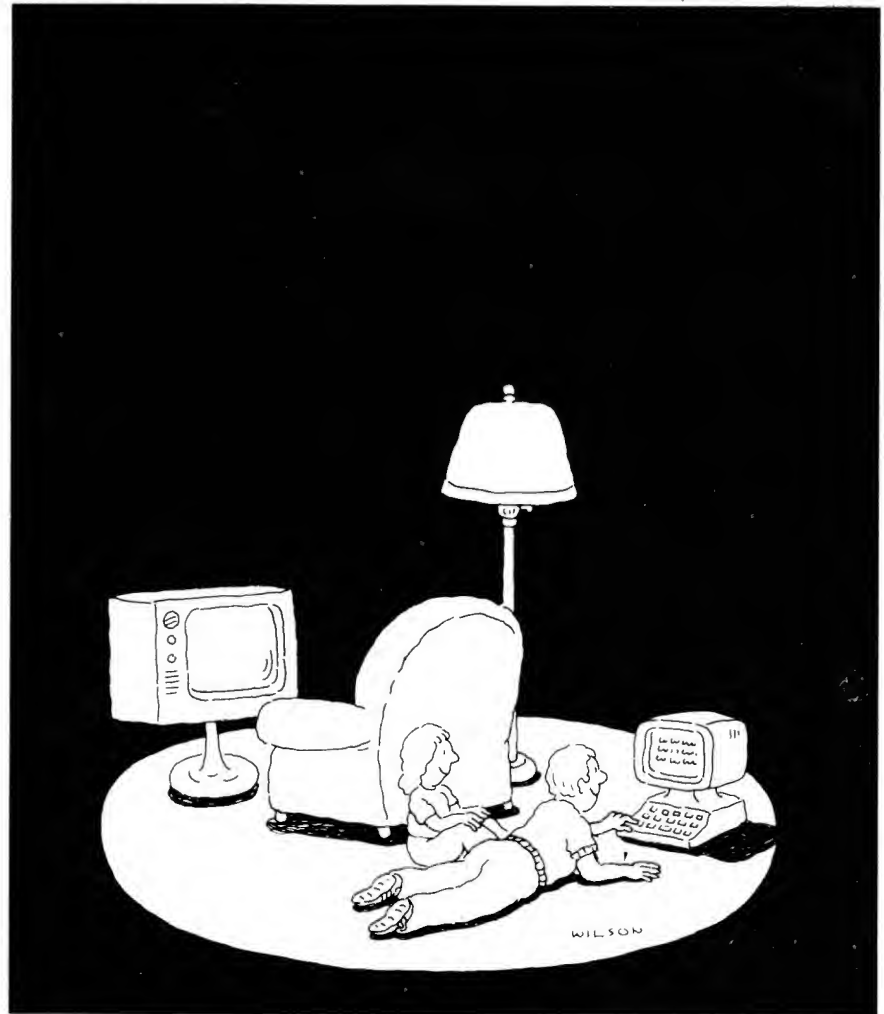
Now replace the RAM chips one row at a time. The RAM chips are surrounded by a white square painted on the MLB. There are three horizontal rows of eight chips. The row closest to the rear of the computer contains the 16,384 addresses from 32769 to 49152. The middle row is 16,384 to 32768 and the row closest to you is 0 to 16,383. You can think of each row as one 16K bank.

To get at the RAM, remove the screws holding the base of the computer, lift the front enough to get at the keyboard encoder jumper, and unplug it from the MLB. Set the cover and keyboard aside. With the base in front of you, carefully remove the eight RAM chips from the first row. Note that the letters A through K are painted along both sides and the numbers 1 through 14 along the top and bottom of the main logic board. Using the letters and numbers to form a grid, find position E3. This is the place on the MLB where the first row of RAM starts. Replace the RAM with known good RAM borrowed from a friend or purchased. Apple uses 4116 RAM, which can be bought fairly cheaply from electronics hobby stores.

Be sure everything has cooled off and test. If it fails, you can assume the RAM you removed is okay and use it to replace the next row starting at D3. Continue in this manner until all the RAM has been tested. If all else fails, replace the MLB.

The Mail Bag

In case you haven't noticed, this column is devoted to your hardware, firmware and sometimes software problems. We cannot answer your questions unless you ask them—so ask! You don't have to be fancy; just a note will do. If you have the solution to a sticky problem, send it along and The Apple Clinic readers will benefit from your experience. Address all mail to: The Apple Clinic, *inCider* Magazine, 80 Pine Street, Peterborough, NH 03458. ■



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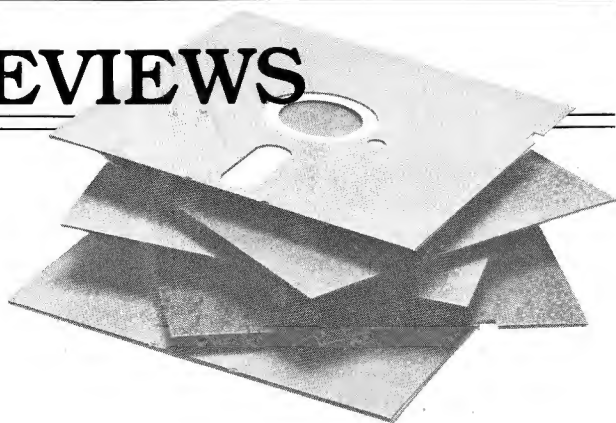


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SOFTWARE REVIEWS



Kinder Koncepts

Educational software is largely what you, the teacher or the parent, make of it. This is especially true of a set of educational games for kindergarten and primary grade children from Midwest Software called Kinder Koncepts.

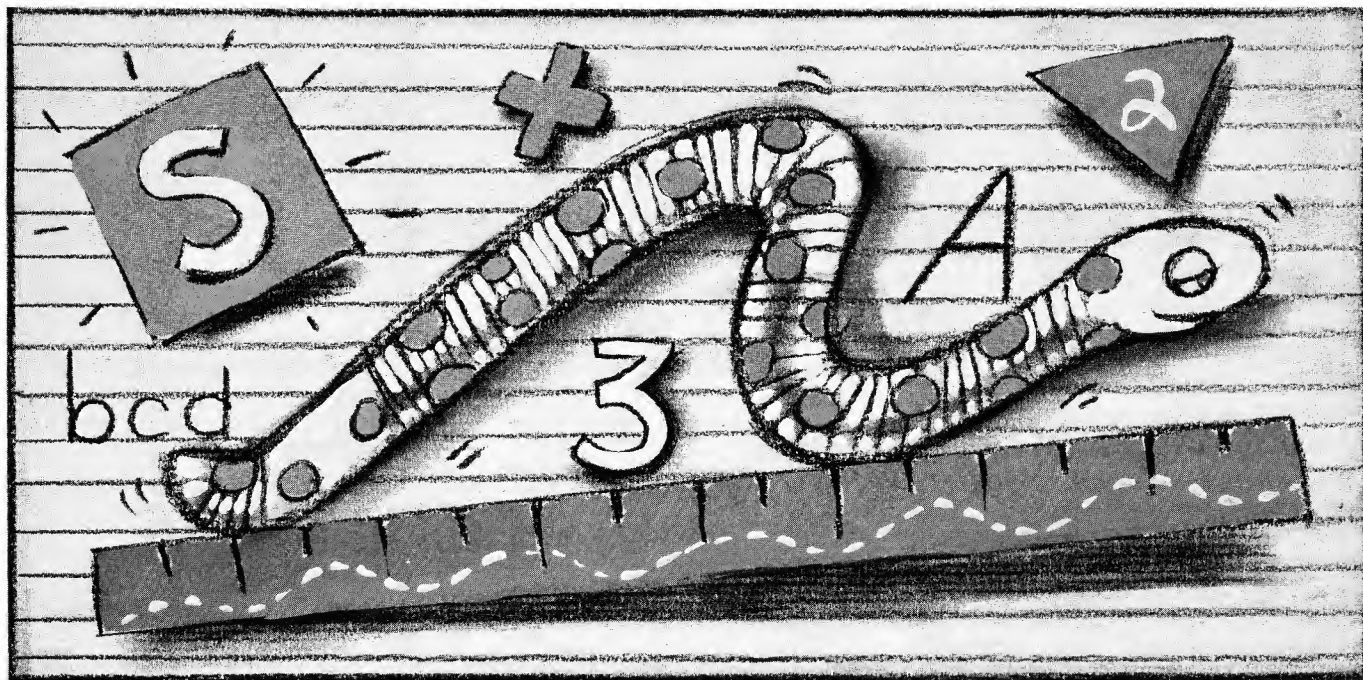
Kinder Koncepts is a package of 15 math games and 15 reading preparation activities with five games on each of six disks. The math programs provide counting, addition, and subtraction drills. The reading prep programs reinforce shape recognition and discrimination, letter recognition, and alphabet skills.

The first set of math games starts with "Begin To Count," in which the child counts shapes displayed on screen and hits the corresponding numerical key. In "Which Has More," two boxes displayed on screen contain a certain number of shapes. The child picks out the box with the most objects. This game is followed by "Which Has Less," the same game in reverse.

In "Find The Longest," five segmented bars float vertically above the X axis of a bar graph. The student must pick the letter of the longest bar. "Find The Shortest" is essentially the same game, in reverse. These are excellent games to reinforce both counting and estimation skills.

"How Far Will It Go" is a cute game involving an inchworm that travels over a segmented, horizontal bar. A number displayed below the bar indicates how many segments the worm will travel; the child must hit the space bar the same number of times, lighting up the segments. This provides excellent counting practice.

In "Begin To Add," the child is shown two sets of circles set on plateaus with a valley between. The child counts the number of circles on the left, then on the right, and then the sum. After the correct answer is given the display becomes animated, dumping the circles in the valley one at a time and giving the child an opportunity to count them as they top-



ple. This is a good addition program; it reinforces set theory and whole number concepts. Visually, it demonstrates the relationship of addition to counting.

"Subtraction" is not as impressive. It is more a guessing game. Two rows of corresponding shapes are displayed with some of the lower tier items hidden. The child must correctly count the number of shaded items in the top row without a matching shape below. A more effective approach would have been to start with all items in the open and then hide a few, or use animation to take items away from a set. As it stands, "Subtraction" isn't useful in teaching that arithmetical operation.

The math games vary in quality from average to very good. A few of the games are quite good, especially "Begin To Add" which translates the concepts of addition into vivid graphics. The programs assume the child has prior skills in counting and in recognition of numeric characters. They certainly are not a suitable introduction to number skills, but rather a means to drill the child.

Geometric shapes and letters form the reading games to teach the visual skills of identification and discrimination that are necessary prerequisites in learning how to read.

"Shape Match" displays a geometric shape with three possible matches. "Letter Match" is more or less the same game, but using letters. Following is "Next Letter." It is the same as the "Next Number" math game, except that it drills the child in ABC's.

The game also includes "Different Shape." Here, the student identifies which of four geometric shapes does not match the other three. The set finishes with "Copy These Letters," where the child is shown three letters and then must find them on the Apple keyboard.

In "Different Patterns," the child is shown four graphic patterns and must distinguish which of the four does not match. In "Hidden Within," the most challenging of the games, the child is shown a sequence of three letters which is repeated somewhere within a six-letter sequence below. The child must blank out the unwanted letters and save the wanted ones.

The reading games emphasize

learning to distinguish shapes. By using drills with graphics, the reinforcement of definite shapes and their differences—called discrimination—is introduced. Letters are treated the same way, since each letter is a specific shape. The programs also use simple drills to reinforce alphabetical skills.

All of these programs depend on the strong participation of the teacher or parent. A teacher cannot let the child sit at the terminal alone and expect miraculous results. The teacher must be there to sound out the letters, to count along with the child, and to use the material creatively. These programs will not baby-sit for you.

The programs' strong points include large numbers and letters for easy reading, musical and graphic reinforcement for successful work, and evaluation graphs which trace the child's performance. On the minus

side, the drills cannot be modified to suit a lesson plan. There is no permanent record-keeping of the child's progress. The teacher must manually record reports.

Kinder Koncepts seems well-suited for both the home and school environments. Mom and Dad must remember that just like teacher, they can't expect the child to get the software's maximum benefit by doing nothing while the computer baby-sits junior.

Pricing depends on how much of the total package you purchase. A demonstration disk with two of the games is \$10. Each disk of five games lists for \$39.50. The entire set of 30 programs costs \$175. See if your dealer will test run the programs so you can decide if they suit your child.

Kinder Koncepts is available from Midwest Software, Box 214, Farmington, MI 48024. The software will run on the //e and any 48K II Plus. Versions for other systems are available. ■

Brian J. Murphy
Fairfield, CT

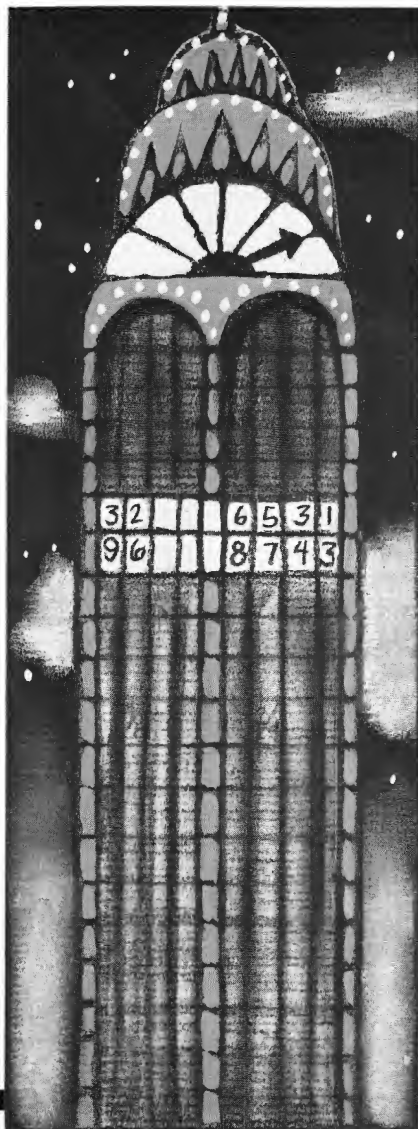
Fraction Factory Edu-Ware Fractions Fraction Fever Fractions

Here are four different fraction programs that handle all aspects of fractional computation, some more completely than others.

Fraction Factory by Springboard Software Inc., presents a program for the young learner—second through fifth grade. *Fraction Factory* relies upon graphic displays to explain the program. There is no displayed menu to choose from, but by watching the graphics, the child can understand what to do and how to do it.

The program starts simply by counting the number of colored boxes to illustrate the fractional part of the whole. It becomes more difficult as the numbers in the boxes become larger. A mistake is handled immediately with a simple explanation, and the student is asked to try again.

After each correct answer, a happy face appears and climbs a step on a



set of stairs. Each session consists of ten examples.

Fraction Factory is an excellent introductory program in fractions for the young learner. The graphics, accompanied by a happy tune, are appealing and very well presented. The child's interest never founders, as I found when I presented the program to a group of third through fifth graders.

Fraction Factory presents addition, subtraction, and equivalent fraction computation, making it an outstanding program for the primary grades. It would be a welcome addition to any school or home software library.

Edu-Ware presents an all-encompassing program in the instruction of fractions and decimals. *Edu-Ware Fractions* is divided into four parts: pretest, learning manager, six learning units, and a post-test.

The pretest is a tool used by most classroom teachers for evaluating the child's progress; Edu-Ware uses this excellently. After the pretest, the student knows exactly where his/her strengths and weaknesses lie. The student can then direct his/her own destiny in mastering a skill through the learning manager. No time is wasted on mastered skills.

Each of the six learning units begins with rules and examples, beautifully illustrated. Before beginning the exercises, the student is told what he is expected to accomplish and what is necessary to advance to the next unit. Nothing is left to guesswork. An incorrect answer sends the program automatically to the rules for review.

Edu-Ware has cashed in on all the positive aspects of skill instruction. The program is a step-by-step learning process managed by the student; this is one of Edu-Ware's objectives. Never in the program does the student have to ask, "What do I do now?" In addition, the student advances at his own speed.

Fraction Fever by Spinnaker incorporates arcade action with the recognition of equivalent fractions. The object of the game is to ride the fraction elevator to the twentieth floor by matching equivalent fractions on the floor to fractions pictured at the top of the screen. Points

are scored by eliminating the unequal fractions pictured along the floor with the equivalent fractions. To make the game more interesting, a time limit is set to find the right fraction. If time runs out, the player misses the elevator. In addition, each eliminated fraction creates a hole in the floor; the player must jump over the hole or else fall to the floor below. The game ends with the player reaching the top floor and winning, or falling to the bottom floor and losing.

Fraction Fever presents one of the finest examples I have seen of graphic and audio displays in educational programs. However, the game is very hard to follow and can prove discouraging. Several players, ranging in age from ten up, attempted the game over and over again. They were never able to advance any further than the fifth floor, and that advancement was only by chance. The problem lies in the skimpy manual that accompanies the program—it doesn't explain the game. More examples should be given so the player, regardless of age, knows what to expect. An older player might spend hours trying to figure out the game, but a younger player loses interest quickly. Fraction Fever is an excellent idea and it certainly could make learning fun with a better illustrated manual.

Quality Educational Designs presents one of the finest math programs I have ever seen. *Fractions* is a well organized, self explanatory, and pleasant program. Its six disks cover all concepts of fractions and their operations.

Each program begins with a detailed set of instructions and examples, eliminating the need for a manual. A first-time computer user may need outside help with the loading of the disk, but other than that, everything is included in the program. Following the instructions, the student is asked to present some of his/her own fractional problems and then is given computer problems. If the student is familiar with the program, he/she may bypass the instructions by answering yes to the question, "Have you used this program before?"

Fractions seems to have covered every aspect of fractional instruc-

tion. Some of the special features that appealed to me were the placement test in the first disk, clear instructions, and the enrichment and challenge games at the end of each program. My students and I especially enjoyed the games.

I have only praise for this all-encompassing package. My enthusiasm was so great that I immediately approached my principal about purchasing the complete package. The price, \$175, is a bit steep for one concept of mathematics, but this program might turn an uninterested math student into a zealous one.

Of the four programs reviewed, I obviously favored the last program, but each program has unique qualities. Consider each in relation to your program's needs.

Fraction Factory costs \$29.95 and is manufactured by Springboard Software, 7807 Creekridge Circle, Minneapolis, MN 55435. *Edu-Ware Fractions* costs \$49 and is manufactured by Edu-Ware Services, Inc., 28035 Dorothy Drive, P.O. Box 22222, Agoura Hills, CA 91301-0522. *Fraction Fever* costs \$34.95 and is manufactured by Spinnaker Software, 215 First Street, Cambridge, MA 02142. *Fractions* costs \$175 and is manufactured by Quality Educational Designs, P.O. Box 12486, Portland, OR 97212. All these programs run on the Apple II Plus or //e with 48K and one disk drive. ■

**Bonnie Fox
Merrimack, NH**

Kids on Keys

Floating hot air balloons, chugging trains, and a lilting song—that's how children are introduced to Kids on Keys, a program from Spinnaker's Early Learning Series (for ages three to nine). Written by Frieda Lekkerkerker, Kids on Keys familiarizes children with the computer keyboard through the identification of letters, numbers, pictures, and words.

In game one, letters cascade down the screen and the user must press the matching key on the keyboard before the letter disappears. The let-

ters move faster as the level of difficulty increases. As pictures move down the screen in game two, the child must identify them and type in the correct word before the images vanish.

The pictures, in game three, must be matched to the flashing word by pressing the number assigned to the images. For example, when the word "boot" flashes on the screen, the user must press the number under the pictures of the boot. The bonus round in games two and three may present some difficulty at first. After identifying the full pictures of the regular rounds, partial pictures of identical items float down the screen and must be correctly identified. Some of the partial pictures are difficult to recognize; others are impossible.

After striking the proper keys of the descending letters in the bonus round of game one, a hot air balloon drifts down with a three or four letter word written on it. The child must correctly type the word before it disappears. If successful, the balloon floats upward and the child is rewarded with points and a waving friend standing in the gondola.

Although Kids on Keys is for children as young as three, this may be a little optimistic. Before three- and four-year-old children can gain familiarity with the keyboard, they need to know their alphabet and numbers. While the program may be too simple for 12- and 13-year-old children, it is difficult and frustrating for three-year-olds. Younger children need adult supervision and guidance when implementing Kids on Keys.

Kids on Keys is a comprehensive program for the Apple II family, Atari, and Commodore 64 computers. The program comes with an addendum to the manual for Apple users, and a booklet with loading advice for the Atari and Commodore 64 computers. A detailed analysis of how to make and edit your own pictures using a joystick is also included. Kids on Keys, which needs 48K and one disk drive, is produced by Spinnaker Software, 1 Kendall Square, Cambridge, MA 02139. The price is \$29.95. ■

Gerald T. Robinson
Windham, NH



Create-A-Test

Have you ever found yourself shuffling through old tests, cutting, pasting, and tossing aside questions just to create a new test from the questions you gave before? Create-A-Test may be the program you need, used alone or with prepared question disks.

Create-A-Test is a good example of software developed to serve the needs of the test maker who has compiled a data base of questions over the years. Users can compose tests by choosing questions from their own self-created

files, files sold separately by the company, or any number of other disk sources. The primary software package consists of a master disk with an additional back-up, a question data disk, a blank disk, a 36-page manual, and a list of the questions on the sample disk.

The company also sells 43 prepared question disks, each containing 400 questions from a particular subject area: 14 disks are available in chemistry, ten in biology, four in physics, two in junior biology, three in junior physical science, four in American history, three in American government, and three in geography.

Create-A-Test is for the Apple II Plus with no minimal memory size indicated. The instructions are clear and complete with sample statements and printouts. The updated manual contains instructions for using the program on the Apple IIe as well as for changes occurring with such modifications as lowercase cards. An easy-to-use editor is also included for editing questions.

Short questions can be entered as single questions while longer ones can be entered using a series of connected questions. Answers can also be stored in the question file so they will not be printed out as part of the test. The test is printed in lowercase unless capitals are entered through the editor. The test compensates for the 40-column limitation by printing two lines as one line—a useful feature but requiring a little experimentation to get used to. Create-A-Test includes subscript and superscript options.

Questions may be added to the list, reviewed, printed, changed, or deleted. Once put together, sample tests

“Questions may be added, reviewed, changed, or deleted.”

may be reviewed and edited before being printed. Tests may also be saved on the disk for future use.

For efficiency, you should print a copy of your questions with a key number related to the record in the file. When creating a test, the proper heading is indicated and the questions are selected from those on the data disk. The computer produces a final copy of the test with the questions properly numbered and the desired heading. Editing the final test is also an option. Since the user does the selecting, redundancy and question appropriateness are not problems.

Create-A-Test is a useful piece of software and well worth the price. If you find yourself pressed for a data bank of questions in your subject area, the additional disks can be helpful.

Create-A-Test is manufactured and sold in Canada by the Create-A-Test Company, 80 Tilley Drive, Scarborough, Ontario, Canada M1C 2G4. U.S. purchases can be made through Cross Educational Software, 1802 North Trenton Street, P.O. Box 1538, Ruston, LA 71270. The program sells for \$89.95, and replacement disks cost \$6 each. ■

**Anna Mae Walsh Burke
Fort Lauderdale, FL**

Magicalc

When VisiCalc brought the electronic spreadsheet to small computers, I felt I found the program of my dreams. For hundreds of applications, VisiCalc did the trick. Good as it was though, I found things that needed improvement. Not big things, perhaps, but annoying nonetheless.

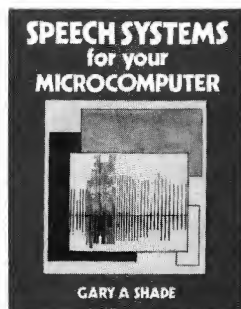
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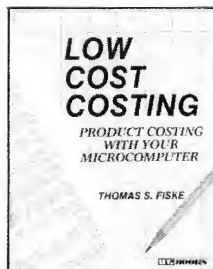
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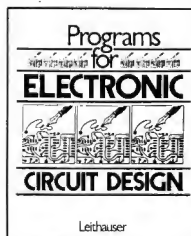
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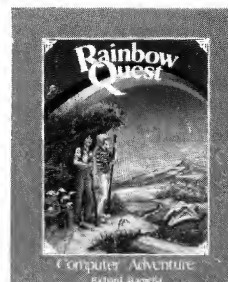
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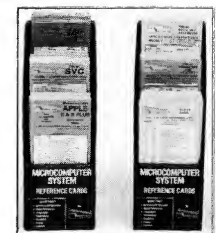
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Rainbow Quest

Rainbow Quest combines fiction and computer programs to form one giant fantasy for young readers. On the Rainbow Quest, Molly and Sam must pass a series of tests in order to succeed. The reader gets involved by taking each test on the computer. Included are mazes, number quizzes, logic tests, word puzzles, and arcade-style games. Book and disk for Apple II, II+, and IIe sold together. \$24.95, CC7407, 120 pp., NEW.



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has introduced a program that made me move my trusty copy of VisiCalc to the back shelf. It is as if someone asked me what I would like to change about VisiCalc, and then wrote a program to my specifications. Magicalc, Artsci's new spreadsheet program, is the best I have seen near its price.

Design Maneuvers

Artsci decided to enhance a proven format rather than re-invent the wheel. Magicalc is almost an exact duplicate of VisiCalc in terms of layout, command structure, and file format. If you have used VisiCalc, you could sit down with Magicalc and operate it without a hitch.

Magicalc supports 80-column video boards. The four arrow keys on the //e now provide full cursor control in all directions, a welcome change from the space bar method. (The latter is still available for owners of older machines, but you are not locked into the method.) Granted, the latest version of VisiCalc does

this as well, but Magicalc works on both the II Plus and //e and has a lot more in store.

Cursor movement is very versatile with Magicalc. Along with standard cell-by-cell movement and direct GOTO commands, Magicalc's commands move the cursor up or down one half-screen at a time or directly to the beginning or end of the worksheet.

My favorite enhancement is the ability to set column widths individually. It aligns one column for eight figures without wasting the bulk of

another column that will never exceed two digits. Columns for percentages are easily mixed with longer figures anywhere on the display or printout. There are plenty of little tricks available thanks to this feature, such as filling a one-character wide column with a broken line to create a vertical divider. Not only are the spreadsheets produced with Magicalc neater looking than those made with other programs, it's possible to fit much more information into a lot less space, as in the **Figure**.

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Figure. Magicalc varies column widths for more efficient use of space on spreadsheets.

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Another welcome addition is Magicalc's capability to protect a cell or group of cells from accidental overwriting. You can put labels or formulae anywhere in your spreadsheet and not worry about sending them to Mars with mis-entered data.

Spreadsheet Specifics

Magicalc spreadsheets contain cells that will accept only certain data, thus preventing someone from entering a label where a value should exist. What's more, cells may be set to "hide" their contents from view while remaining available for use.

When designing a spreadsheet, there are times when information must be copied from one cell to another, or repeated through an entire row or column. While all programs accomplish this feat in some manner, Magicalc's commands are unusually flexible. Not only can you copy the standard way, but it is also possible to copy just the cell's format (such as left justified or dollars and cents) or its attributes (protected or hidden) without affecting the destination cell's contents. The opposite is also true, allowing you to copy only the contents, without changing the formats and destination attributes.

Magicalc's menus help you select various functions. The print routine, for example, brings up a menu showing the available options.

Magicalc does not require that you specify the starting and ending cell every time a worksheet is printed. The menu shows the current default values starting at the top left and bottom right corners of the worksheet. Other values, however, may be entered which then become the defaults. When the worksheet is printed, Magicalc paginates the paper and prepares for the next printing. If you have ever used VisiCalc to print several copies of a spreadsheet, you know how annoying it can be to align the paper every time.

The print format contains data specifying the margins, page length, and text width. When the data exceeds the available print space, the excess is automatically put on a second page. No matter how wide or long your spreadsheet is, it will always fit within the limits of your printer and paper.

The File Subsystem Menu

When dealing with loading, saving, or modifying files, Magicalc shines. Entering /S brings up the File Subsystem Menu, which presents a list of available options. A complete catalog of files is displayed on the screen and each file is numbered as an option to using the entire filename. The menu includes ways to delete, lock and unlock files, and change the default disk drive and volume.

Magicalc can even save or retrieve files written in Visicalc's patented

DIF (Data Interchange Format), thereby sharing information with different programs. Templates and complete files may be transferred from Magicalc to VisiCalc and back again in all modes, but "fancy stuff" (such as varied column widths) will not appear in the VisiCalc version.

Documentation is excellent and a quick reference card is provided. The program is packaged in a boxed, loose-leaf binder that will stand up to plenty of use.

Magicalc sells for \$149 retail, and is \$100 less than VisiCalc. I found it a better program all-in-all. I recommend Magicalc for any current spreadsheet user, as well as the first time buyer. It is flexible, easy to use, and surprisingly affordable. ■

W. Charles Doherty
South Dartmouth, MA

The Print Shop

Want to make money with your Apple or just save money and have fun in the process? Consider preparing personalized greeting cards, signs, announcements, banners, and letterhead stationery. All you need is an Apple II Plus or //e with 48K memory, a dot matrix printer such as Epson, Apple Dot Matrix, or Imagewriter, and a \$49.95 copy of Broderbund Software's The Print Shop.

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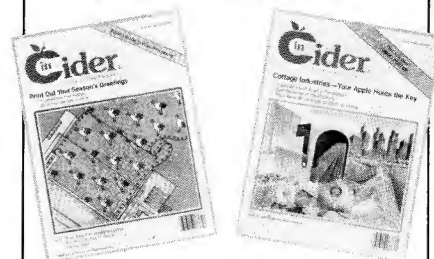
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particularly attractive: the image library (drawings, symbols, patterns, line styles, and text fonts); the ease with which you can design materials, and the high-resolution print quality.

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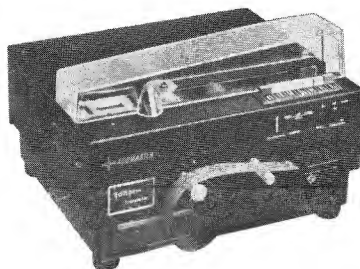
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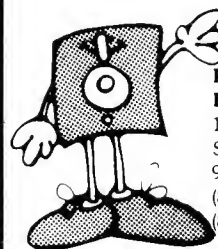


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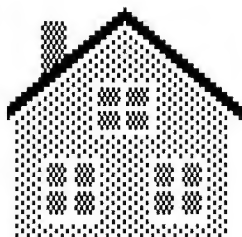
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When printed, greeting cards appear as four panels on a single 8½-by-11-inch sheet of paper. After folding it twice, the two page card measures 4¼ by 5½ inches. Cards that are 8½ by 5½ inches also may be produced.

Printing is slow but worth the wait. The printer advances in 1/72 inch vertical increments which is 12 times finer (and slower) than the standard 1/6 inch per line. The result is fine quality graphics for a dot matrix printer.

In addition to greeting cards, you can design and print 8½-by-11-inch signs, letterhead stationery, and banners measuring 11 inches wide and more than 11 feet long.

If you cannot find a graphic image that you need among the 60 plus images which accompany the program, a graphic editor allows you to design and save your own graphics. Also, you can create and save standard Apple DOS 3.3 image files with a Koala Pad or other software and retrieve the images for printing with "Screen Magic." The Print Shop's screen printing utility. Screen Magic includes a dazzling kaleidoscope generator to create background imagery.

Helpful features for future versions should include the ability to preview your final image on the screen and also to save your final image or its associated command sequence as a file.

Overall, The Print Shop is an outstanding software product with practical uses as well as enjoyable visual displays.

The Print Shop is manufactured by Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. ■

Alan Schmidt
Concord, MA

Apple Logo //

You might think that with 20 other versions of Logo, it wouldn't be easy to get excited about another Logo package. No language may be all things to all people, but for owners of the Apple //e with 128K and the Apple //c, Apple Logo // is about as close as you can get.

Before, with Apple Logo, just as users became comfortable with the language, the computer came back with "OUT OF SPACE." Because of the limited workspace, many perceived Logo as merely a learning language for children. It is a lot more, and Apple Logo // offers all ages the chance to explore the power of this language.

First of all, users now have considerably more memory available—7184 nodes with Apple Logo // compared to 2815, the maximum available with Apple Logo. (A node is 5 bytes.) Secondly, the language is easier to use. It comes with two tutorial disks that take you through the features of Logo. The program disk includes a HELP command. While using the language, HELP and the name of the command about which you want information will define how the command is used. Beginners not sure of which command to use can press the Open-Apple and the question mark for a list of turtle graphics and editing commands.

In addition to the three disks, Apple Logo // comes with a comprehensive reference manual and a tutorial manual. The tutorial, however, is limited to turtle graphics.

Apple Logo // includes a TOOT command. By adding the frequency and duration to this command, it is possible to create sound effects as well as music. The frequency can range from three to 65,535, well below and well above human hearing. The duration can range from zero to any four-digit number. TOOT 262 60, for example, will play middle C for about one second.

FILL is another command available in Apple Logo //. Previously, users had to write their own FILL commands. For irregular shapes, this could get a bit complicated. Any figure can be filled with the selected color by putting the turtle inside the

SOFTWARE REVIEWS

figure and entering the word, FILL, and your color choices.

The best news for serious Logo users is the addition of file management commands. Apple Logo // uses four types of files: program files for Logo procedures, picture files to which turtle graphics pictures can be saved, data files for lists of names or other information you want to save, and dribble files. (Dribble files are records of the text printed on the screen.) Up to six files can be opened at one time, making such applications as data base management, accounting, and other professional uses easier than with Apple Logo.

Some people might argue that the assembly language access commands are the best feature of Apple Logo //. Certainly, these commands make the language more flexible. The reference manual provides all of the essential information needed to access assembly programs as well as the computer's memory.

Apple Logo // is more complete, more flexible, and just as friendly as Apple Logo. It incorporates all of Apple Logo's beautiful logic with new features and new commands that expand the power of the language for those with 128K of memory available in an Apple //e or //c. You can even use a mouse.

Unfortunately, there is a catch. Apple Logo commands allowed direct access to the slots of the Apple //e. Printing of graphics was undoubtedly the most widespread use of the .PRINTER command. Through different printer interface cards, users could write a short procedure and print graphics to a variety of dot matrix printers. Now these users will have to use the Imagewriter or save Apple Logo // pictures as binary files and then use other graphics dump routines to print the graphics.

If there were anything to change in Apple Logo //, this one feature would be it. The printing of graphics is invaluable for all ages. Not only does it provide a record of accomplishment, it opens up three dimensional Logo. Designing three-dimensional shapes on the two-dimensional screen, printing them, and then folding the paper into the designed shape, has opened up new worlds of visualization for students as early as the third grade.

Turtle graphics and a printer provide other excellent learning activities for children.

It's fascinating to watch the unfettered imagination of a child begin to grow through exploratory work with Logo. It is even more fascinating to watch adults become childlike as they explore their own creativity through the language.

Apple Logo // is manufactured by Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014. It retails for \$100. ■

**Jim Muller, President
Young People's Logo Association**

Mastering the SAT

Mastering the SAT is a skill-building package consisting of four disks (easily backed up) and an accompanying manual. The programs were written for Apple II or Apple compatible computers with one disk drive and, preferably, a monochrome monitor. The package provides motivated students with a tool for practicing verbal and mathematics skills in preparation for the Scholastic Aptitude Test (SAT). This system was written by three public school administrators/teachers in conjunction with the National Association of Secondary School Principals (NASSP). It is published by CBS Software, One Fawcett Place, Greenwich, CT 06836, and retails for \$150. A 90-day warranty is included, and replacement disks cost \$5 after that period.

The system is organized into two major components. The first consists of computer-based practice and testing, while the second includes book study and pencil-and-paper practice examinations. The computer portion of the package has two computer-administered, full-length simulated SAT examinations, computerized verbal and mathematics skill-builder exercises, and a vocabulary-builder exercise. The non-computer portion consists of two pencil-and-paper, full-length simulated SAT's, and an essay on test-taking strategies.

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First, the student should complete the computerized SAT pretest and study the computer-generated analysis of his/her results. Next, the student should study the essay on test-taking strategies. After those preliminaries, the student should return to the computer and complete the battery of skill-building exercises. Then, the student should work through both of the pencil-and-paper SAT simulations. Following this, the student should return to the computer to complete the simulated SAT post test, and study the computerized analysis of his/her performance. Lastly, the student should work on the vocabulary skill-building exercises. As you can see, the process involved in "mastering" the SAT is rigorous, though effective, for sufficiently motivated students.

The computer-based portion of this package has several noteworthy strengths. First of all, the computerized grading and analysis feature provides instant feedback (based on the SAT scoring scale) concerning how well a student may perform on an actual SAT. The program will store the analysis on disk or print it out on paper.

Since completing an SAT takes about three hours, the program allows students to quit at any point in the examination and return to that same point later. Also, two or three students may share the test disk by using it at different times during the day; the computer will manage each student's progress through the test. Students can skip questions and return to them after completing the remainder of the test.

When students have finished the test, they may review all or some of the questions accompanied by the correct answers and *explanations* of the correct answers!

The two best features of this program are the skill-builder and vocabulary-builder exercises. Both of these tutorials are excellent.

Along with the package's strengths are several minor weaknesses. The space bar is used as a "page turner" key, and this does allow for individual reading rates; however, if a student accidentally presses the space bar too many times, valuable information will be lost, because there is

no way to back up and review a previous page. The authors did attempt to minimize this problem by adding a "go-to-previous-page" key for lengthy passages in the reading comprehension sections. However, they did not provide for a "go-back-to-passage" key that students could use to retrieve text needed to answer a question. This is a weakness because test-takers do have that option on the real SAT.

The software will not allow a student to change the answer to a previous question; he/she can only return to skipped questions.

Although the two pencil-and-paper SAT's are more realistic practice for the students, the lack of an easy way to grade (or estimate a score) on those two examinations is a weakness. The package does include the answer keys for the pencil-and-paper SAT's; however, full-size answer forms, scoring templates, and a formula for estimating the overall examination score would have been welcome additions. In lieu of these additions, I would have preferred to see all four simulated SAT's administered by the computer. ■

Michael L. Waugh
Statesboro, GA

PLATO Courseware

Control Data Corporation has published two welcome additions to the educational software market: PLATO Whole Numbers and Fractions packages. Both are drills, but drills with a difference; they're mildly entertaining games which make good use of graphics and motion while practicing fundamentals. One is geared to a test format while the other provides room for teaching and experimentation.

Whole Numbers

Whole Numbers takes the form of a pinball game. There are five balls—one each for addition, subtraction, multiplication, division, and a mix of problems. The screen has four bumpers worth 20, 30, 40, and 50 points; each bumper contains a problem that must be solved within the given time after the ball

hits the bumper. As the game progresses, the allotted problem solving time decreases from seven seconds to one second.

The player has three chances to solve the problem within the time limit. If the player takes too long or misses all three tries, the bumper goes off. When three bumpers have gone off, there is one more problem before the ball is lost. If the player takes too long or makes three incorrect attempts, the bumper displays the correct answer in a circle.

Whole Numbers features a Hall of Fame for players to record the ten highest scores. This is useful in a home environment as it allows Mom and Dad to keep track of progress, and might also be useful in schools to encourage accurate work. Only the person who has the documentation knows the password which allows deletion of entries in the Hall of Fame.

It is impossible—for me at least—to enter the game for one problem and then repeat it. So, if I wanted to work with the multiplication tables, I must go through the addition and subtraction lessons in order to get there. The time spent on addition and subtraction might not necessarily be wasted, but it would be nice if the user could tailor the program slightly. The single disk is copy protected, but back-up copies are available from the manufacturer. Also, the purchase agreement offers no clue as to how to get another disk after the 90-day warranty expires, but, once again, they are available from Control Data Publishing.

The documentation consists of a 12-page booklet which, along with the instructions in the program, is clear and quite adequate. Because of the wording, it's a booklet for parents and teachers, not for students.

All in all, Whole Numbers helps improve addition, subtraction, multiplication, and division skills; increases speed and accuracy with basic number facts, and helps distinguish quickly between operations.

Fractions

On the surface, PLATO Fractions is a simple dart toss bit of graphics fluff which can't do any harm in teaching fractional differentiation and identification or demonstrating

fractional intervals. Actually, it's much more and with parent or teacher guidance, it can be a powerful teaching tool.

In the game, balloons are extended horizontally from a vertical number line. The student estimates the correct fractional expression to describe one balloon's position, enters it through the keyboard, and then throws a dart by pressing the return key. The student can toss darts at any point along the number line, as long as he or she stays within the upper and lower limits, including negative numbers.

If the answer is close enough, the balloon pops and the entered number is shown. If the student misses, the dart lands on the number line at the guessed position which is, again, recorded. There are ten levels and the program changes levels according to how many darts the student uses. No time limits restrict play and nothing in the way of graphics or sound distracts the student. As in Whole Numbers, the sound can be toggled off.

As a nice touch, the student can toss dart after dart at the same point using different expressions and Fractions will show the equivalents. For example, if you enter $1 \frac{1}{4}$ the dart will appear at that point. If you then enter $\frac{5}{4}$, the dart will go to the same point and the screen will show $\frac{5}{4} = 1 \frac{1}{4}$. If you try 1.25, another dart hits the same point and the display $1.25 = \frac{5}{4} = 1 \frac{1}{4}$ appears. Youngsters can experiment for protracted periods with this format, since there is no wrong signal to stop experimenting with combinations.

PLATO Whole Numbers and PLATO Fractions are serious, useful educational programs, not slow games masquerading as educational software. The graphics enforce the time limits and encourage perception. The lack of a back-up disk and the lack of imagination in the documentation for PLATO Fractions, however, mar otherwise first-rate software.

The PLATO programs are available from Control Data Publishing, 4455 Eastgate Mall, San Diego, CA 92121. They cost \$49.95 each. ■

E.R. Campbell
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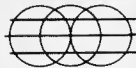
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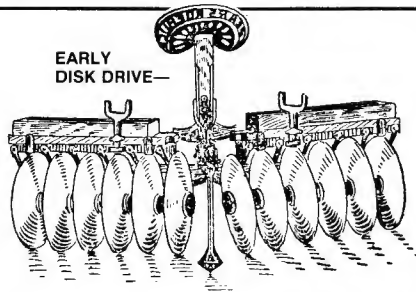
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ELSE follows Applesoft If-Then statements, like this:
IF X=2 THEN PRINT "YES": ELSE PRINT "NO"

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 10 HGR2
 : FOR Y=0 TO 191
 : POKE 228, C
 : C=C+1/9-256*(C-255)

20 REM "Double-Take optionally lists each Applesoft program statement on a new line, making program code much easier to read."

30 HPL0T 0,Y TO 279,Y
 : NEXT Y
 : POKE 2053,58
 : GOTO 10

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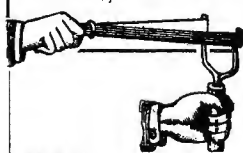
ACTS LIKE A DISK DRIVE in Slot 3, but super-fast and silent! Enjoy many of the benefits of another drive at 1/10th the cost. Catalog with "CATALOG, S3" command. Access all kind of files in RAM with normal DOS commands.

SILENT AND FAST: Since no moving parts are involved, DiskQuik operates at super-high speeds. See to believe! Your Apple IIe's Extended 80-column Card (required) holds about half the amount of data as a 5 1/4" floppy!

MANY USES: For example, load often-used files like FID into RAM when you boot up, so they are always available when you need them. Copy files from RAM onto disk and vice versa, just as if a disk drive were connected to slot #3.

COMPATIBLE with all normal DOS procedures.

1234 TEXT: HOME: NORMAL:
 PRINT CHR\$(21)
 5678 R=INT(RND(1)*10): N(R)=
 N(R)+1: VTAB R+9: HTAB
 40: PRINT CHR\$(124): SPC
 (N(R)): CHR\$(R+65): ;
 IF PEEK(36) THEN 5678



AD #18L

Multi-Utilities

□ UTILITY CITY™
21 PROGRAMMING UTILITIES by BERT KERSEY
\$29.50: Includes Peeks/Pokes Chart & Tip Book #3

LIST FORMATTER prints each Applesoft program statement on a new line. For-Next Loops are indented with printer Page Breaks. A great Applesoft program de-bugger.

MULTI-COLUMN CATALOGS to your printer, with or without sector and file codes. Organize your disk library.

INVISIBLE AND TRICK catalog File Names. Put invisible functioning commands in Applesoft programs too.

21 UTILITIES TOTAL, including auto-post Run-number & Date in programs, alphabetize/store info on disk, convert dec to hex or int to FP, protect and append programs, dump 40-column text to printer. And More.

LEARN PROGRAMMING TRICKS: LIST-able programs and informative documentation. Includes Tip Book #3—Hours of good reading and Applesoft experiments.

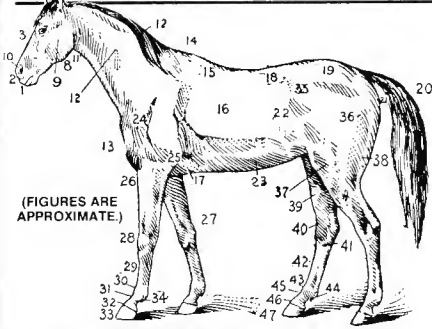


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Attention Appliers: Most Apple dealers and software stores have Beagle Bros products on their shelves. If you can't find the disk you want, bug the manager—he can have any of our products in his store for you within a couple of days.

FREE APPLE COMMAND CHART: Each SILICON SALAD and TIP DISK #1 comes with an 11x17 poster of all Apple IIc, Integer & DOS Commands with Descriptions.



(FIGURES ARE APPROXIMATE.)

□ SILICON SALAD™
WITH TIP DISK #2 by BERT KERSEY & MARK SIMONSEN
\$24.95: With Peeks/Pokes Chart & Apple Command Chart

MANY MINI-UTILITIES: Program Splitter makes room for hi-res pix in large Applesoft programs. **Disk Scanner** finds bad disk sectors. **Key-Clicker** adds subtle sound as you type. **DOS-Killer** adds two tracks of space to your disks. **2-Track Cat** allows up to 210 DOS 3.3 file names per disk. **Text Imprinter** converts text-screen text into hi-res text. **Onerr Tell Me** prints the appropriate error message but continues program execution. **Text Screen Formatter** formats and converts text layouts into Print statements... plus much more Apple wizardry from the boys at Beagle Bros.

MORE TIPS ON DISK: Over 100 programs from Beagle Bros Tip Books 5, 6 and 7; and from Tip Chart #1. **TWO-LINERS TOO:** From our customers around the world—and elsewhere. New tricks for your old Apple!

□ TIP DISK #1™
100 TIP BOOK PROGRAMS ON DISK by BERT KERSEY
\$20.00: With Peeks/Pokes Chart & Apple Command Chart

100 LISTABLE PROGRAMS from Beagle Tip Books 1-4. Make your Apple do things it's never done! All 100 programs are LISTable and changeable for experimentation. Two-Liners too, plus a free Apple Command Chart.

NEW!

Apple® Graphics Utilities

□ BEAGLE GRAPHICS™

DOUBLE HI-RES GRAPHICS by MARK SIMONSEN
\$59.95: Includes Peeks & Pokes Chart
Requires Apple IIc (or IIe with EXTENDED 80-col. card).

560-WIDE WITH 16 COLORS! Beagle Graphics gives your 128K-Apple (required) a full range of colors plus double high resolution—560 x 192 pixels. All Applesoft hi-res functions, including shape tables, are supported.

NEW COMMANDS let you draw fast circles, ellipses and rectangles from the keyboard or from your programs.

FAST COLOR FILL fills any outline with one of 16 solid colors or 256 color mixes (usable in your programs).

PROGRAM & PICTURE-CONVERTERS change your existing Applesoft programs and pictures to double hi-res. "Double-ize" Apple Mechanic shape table programs too!

DOUBLE-PLOT PROGRAM lets you draw and manipulate pictures in double hi-res. Add type to pix too. Move sections of images to either page. Save pictures to disk.

HI-RES TRICKS: Amazing stuff—any portion of a picture may be rotated, flopped, moved, inverted, superimposed, scrunched or even SAVED to disk. Saving image-portions conserves disk space.

10 PRINT CHR\$(ASC(CHRS(ASC(CHRS(ASC('F')/(ASC('P')/8)))))):
GOTO 10

NEW!



□ TRIPLE-DUMP™

SINGLE/DOUBLE HI-RES "PRINT-ANYTHING" UTILITY
\$39.95: Includes Peeks & Pokes Chart

PRINT ANY SCREEN IMAGE on your dot-matrix (graphics-capable) printer—Hi-Res, Lo-Res, Double Hi-Res, Medium-Res, as well as 40 and 80-Column Text. All print functions may be used in your Applesoft programs and disks. Don't settle for a "locked up" printer-dump program.

SPECIAL EFFECTS: Crop, rotate, enlarge, distort, invert... Preview pictures on the screen before you print.

BANNER MAKER: Make impressive 8"-high signs and banners for your family, home or office. Type any message—no length limit—and let your printer do the work!

□ ALPHA PLOT™

STANDARD HI-RES GRAPHICS UTILITY
by BERT KERSEY & JACK CASSIDY
\$39.50: Includes Peeks/Pokes Chart & Tip Book #4

(Alpha Plot offers 6-color 280-pixel resolution and requires only 48K; see Beagle Graphics for 128K double hi-res.)

DRAW IN HI-RES on both pages using easy keyboard commands. Pre-view lines before plotting. Use solid or mixed colors and Reverse (background opposite). One-key-stroke circles, boxes and ellipses, filled or not. All pictures are Save-able to disk for access by your Applesoft programs.

COMPRESS HI-RES DATA to 1/3 disk-space, allowing 3-times the number of hi-res pictures per disk (avg. figures).

MANIPULATE IMAGES: Superimpose pictures or re-locate sections of images anywhere on either hi-res page.

HI-RES TYPE: Add variable-size color & b/w text to your pictures. Type anywhere with no htab/vtab limits. Type sideways too, for Charts & Graphs. Includes Tip Book #4.

□ FLEX TYPE™

FLEXIBLE-TEXT UTILITY by MARK SIMONSEN
\$29.50: Includes Peeks & Pokes Chart

PUT VARIABLE-WIDTH TEXT on both hi-res screens with normal Applesoft commands (including HTAB 1-70). Normal, expanded & compressed text with no extra hardware. (70-column text requires b/w monitor, not a tv).

COMBINE TEXT & GRAPHICS. Run existing Applesoft programs with Flex. GPLE/Double-Take compatible.

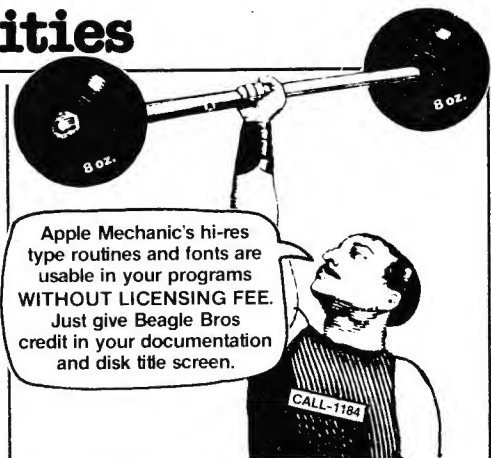
DOS TOOL KIT® font compatibility. Access up to 9 fonts in memory. Text editor lets you redesign text characters.

□ FRAME-UP™

FAST APPLE DISPLAY UTILITY by TOM WEISHAAR
\$29.50: Includes Peeks & Pokes Chart

PROFESSIONAL PRESENTATIONS: Turn existing Hi-Res, Lo-Res & Text pix into Apple "slide shows". FAST 2½-sec. hi-res loading! Paddle or Keyboard-advance frames.

UNATTENDED SHOWS optional—each picture arranged and pre-programmed to display 1 to 99 seconds. Text Screen Editor creates black & white text "slides"; lets you key-in type "live" during shows. Mail copies of presentations-on-disk to friends & associates (or home to Mom!).



□ APPLE MECHANIC™

HI-RES SHAPE EDITOR & FONTS by BERT KERSEY
\$29.50: Includes Peeks/Pokes Chart & Tip Book #5

SHAPE EDITOR: Keyboard-draw hi-res shapes for animation in your Applesoft programs. Easy "List & Learn" Applesoft demos teach how to do hi-res animation as well as professional-looking hi-res Charts and Graphs.

HI-RES FONTS: Access & create proportionally-spaced hi-res type; each character totally re-definable. Six complete fonts are included on the disk (4 large & 2 small).

MORE: Useful music, text and hi-res tricks for your Applesoft programs. Clear educational documentation and step-by-step instructions for writing graphics programs.

APPLE MECHANIC HI-RES

□ TYPEFACES™

26 FONTS FOR APPLE MECHANIC by BERT KERSEY
\$20.00: Includes Peeks & Pokes Chart

26 NEW FONTS for use with Apple Mechanic programs. Many different sizes and typesets, both ordinary and *Artistic*. Every character—from A to Z to "*" to "□"—of every typeface—from "Ace" to "Zooloo"—is re-definable to suit your needs. All type is *proportionally spaced* for a more professional appearance. People do notice the difference!

Disk Librarian

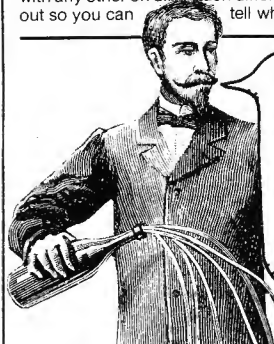
□ FATCAT™

PERSONAL DISK LIBRARY by ALAN BIRD
\$34.95: Includes Peeks & Pokes Chart

MULTIPLE-DISK CATALOG: FATCAT reads all of your DOS 3.3 and ProDOS™ disks into one or more "Master Catalogs" that can be searched, sorted and printed. Update at any time by simply reading in new or altered disks.

ALPHABETIZE FILE NAMES: Sort your DOS 3.3 and ProDOS disk catalogs alphabetically, by file name, type, etc., to make files easier to find. Re-locate individual file names too. Find files fast every time you CATALOG. This feature alone is worth the price of FATCAT!

COMPARE FILES: Compare any program in memory with any other on disk. Each differing program line is called out so you can tell which is the latest version.



"All Beagle disks are Unlocked & Copyable. Don't settle for less."

- 10 REM BEAGLE CARD FILE
20 HGR: HGR2: POKE 232, 120: POKE 233, 64: POKE 16504, 7: SCALE=80: P=16: X=99: FOR R=0 TO 31: P=P*-1: POKE 230, 48+P
30 FOR Y=0 TO 1: ROT=ABS(64*Y-R): HCOLOR=3: FOR A=1 TO 25: DRAW 1 AT X+2*A, X: NEXT A
40 HCOLOR=0: DRAW 1 AT X, X: ROT=32: DRAW 1: DRAW 1 AT X, X: NEXT Y, R
50 FOR A=0 TO 20: FOR B=0 TO 1: POKE 49237-B,0: X=PEEK(49200): FOR C=1 TO 6*A
60 NEXT C, B, A: GOTO 50

Beagle Bag!

□ BEAGLE BAG™

12 APPLE GAMES ON DISK by BERT KERSEY
\$29.50: Includes Peeks & Pokes Chart

Apple software customers recently voted BEAGLE BAG to Softalk's "Most Popular Software" list for 1983.

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EXCELLENT REVIEWS—Read Jan-83 Softalk, pg.148.



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1142 Alien Addition (Home)	34.00	26.75
0013 Alpha Plot	39.50	27.25
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2599 Broadside	39.95	27.70
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2030 SSM Transend 1	89.00	67.85
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0137 TG Game Paddles	39.95	27.65
0136 TG Joystick W/Toggle	59.95	41.50
1330 TG Joystick W/Toggle IIE	64.95	45.00
1730 The Accountant	99.00	64.10
2597 The Accountant—VCalc Intfc	20.00	15.40
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0559 Ultratrim	379.00	284.30
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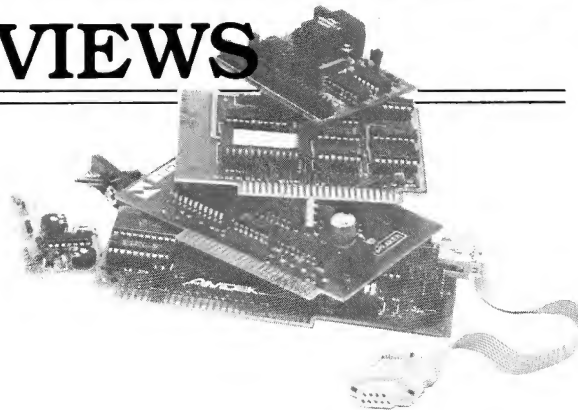
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HARDWARE REVIEWS



PowerPad and Leonardo's Library

Parents and teachers know that children learn best by exploration and immediate response to their actions. Because the computer can provide prompt feedback, it would seem an ideal means of providing educational opportunities for children and adults alike. In most instances, however, computer users are required to use the keyboard. This makes it difficult for a child or someone whose motor coordination is not developed enough to use the machine effectively.

The PowerPad

Chalk Board, Inc., has developed a solution to this problem—the PowerPad. The PowerPad is a large (17-by-20-by-1½ inches), sturdy board with a 12-by-12 inch touch-sensitive surface. Switches under this surface are scanned about 20 times per second. Because there are 100 digital switches per square inch of surface, the PowerPad can sense and respond to touch in more than one place at a time to allow remarkable programming flexibility.

Chalk Board claims that the PowerPad can survive “falling down a flight of stairs or the weight of a child standing on it.” While I wouldn’t recommend this as standard treatment, I did find that the unit was certainly capable of withstanding rough handling.

Based on Jean Piaget’s learning theories, which are the basis for the Logo computer language, the programs in Leonardo’s Library are



open-ended for unlimited exploration. Some of the programs employ the same reasoning and logical skill development processes associated with Logo. When completed, Leonardo’s Library will contain more than 30 software packages spanning six subjects: visual arts, music, mathematics, science, language arts, and social studies. There are five “strands,” or levels of difficulty, in each area.

I reviewed four pieces of software: Micro Illustrator, Bear Jam, LogicMaster, and Leo’s Links. In all cases the graphics were clear, colorful, and appropriate. Each software

package comes with a Mylar overlay that snaps into place to cover the touch-sensitive surface. “Keys,” areas programmed to register a user’s touch, are printed on this overlay. They can be almost any size, and the overlay keys that accompany Leonardo’s Library are large and colorful.

Micro Illustrator

Micro Illustrator is part of the Starter Kit. This package also contains the cable that connects the PowerPad to the computer, the Mylar overlay designed for drawing, a plastic stylus used to touch the pad

(fingers also work well), and the instruction booklet.

The menu uses both words and pictures to present the options. There are 18 color choices and 15 drawing mode options. There are also eight choices for the type of "pen" or line you can use to draw. Selection is made by moving the cursor to the box that represents your chosen function, and then by pressing the Pen Down button on the overlay.

To move the cursor, touch the board area that corresponds to where it is on the screen, and then move your finger to the position of the desired box. It takes very little time for a child to learn this. To draw, you must leave the menu screen by touching the rainbow-shaped Menu button. Once the drawing screen appears, you can draw by pressing the Pen Down button with one hand while touching the drawing surface with the stylus or your finger. A Pen Down button is provided at the left, along with one on the right for left-handed artists.

Micro Illustrator not only allows the user to draw pictures, but to experiment with symmetry and shapes. It also lets you fill in designated areas of a picture. This mode presents the only problem for users. Unless the shape you wish to fill is closed, the color leaks out and fills the screen, obliterating the picture. Some lines are not consistently solid, and the results can be frustrating.

Bear Jam

Bear Jam is for the youngest computer users. It is part of strand one of Leonardo's Library. If you determine the correct answers to the puzzles, you can feed a friendly-looking teddy bear by choosing the "flavor" (color) of jam spread on his bread. After he eats, he dances.

LogicMaster

LogicMaster represents strand two of Leonardo's Library. Using any of four shapes and six colors, you can construct a mastermind-like game in which the player must use logic to put correct shapes with correct colors in the proper places to match a preplanned code. The maximum

"The fun that children have shows that games can be an effective learning tool."

number of spaces you can use is six. This builds on the skills developed in Bear Jam, but this game is designed for an older child.

Once you are familiar with the game, the instructions tell you how to create your own games. If the player will have difficulty playing the game you designed, a Game Clues button sets the program to provide clues. You must set this before you play the game or no clues will be displayed. The player may also scroll through previous answers.

Leo's Links is a golf game with a twist. The player designs the holes, complete with sand traps, water traps, trees, rough, and fairway. Each hole can be saved on a disk so that a full golf course can be used in play. After the player places the tee in an appropriate place, play begins.

Once you know how to play, designing new holes is easy. Press the clear button twice to display a blank green screen and the cursor. You draw each element of the hole the same way as you draw figures to fill using Micro Illustrator. The difference is that the two ends of the outline in Leo's Links must cross over. If the ends don't overlap, the color leaks out and covers the screen. You can erase any element by pressing an erase button, so experimenting with design is simple. You can also change elements of the drawing. For example, if you drew a sandtrap and wanted to change it into a water trap, you would press only three buttons—erase, the new element, and enter. The color changes, and you have changed the elements.

Leo's Links may not help your golf game, but it allows you to practice distance estimation, angles, and log-

ic. The fun that children have designing the barriers and pathways shows that games can be an effective learning tool in addition to being amusing.

The PowerPad Programming Kit consists of a graphics-tablet overlay, an instruction booklet, and a disk containing three utility programs (PowerPad Test with and without machine language subroutines and Command Button Mapper) and two programs which illustrate how to use the basic board routines. It also includes two pens for drawing on the Programming Kit overlay.

The instruction booklet refers to the few incompatibility problems (the shift key modifications in the Apple that use the game I/O connector's SW2 input) and warn you not to use control reset while the PowerPad is active. The routines needed to use the PowerPad with your own programs are explained thoroughly. The booklet also notes how the PowerPad interacts with the computer. Suggestions tell how to avoid false input from any shorted switch—a problem that did not happen while I used the PowerPad, but since each board contains 14,400 touch switches, the possibility exists.

The Command Button Mapper routines are illustrated by the short program, Making Change. Vertical columns on the board represent four coins: a quarter, a dime, a nickel, and a penny. The player is asked to touch the area of the coins to add up to a stated amount of money. In the second program, a waving man moves to the position on the screen indicated by touching the board. Ideas for program modification are included so that the programmer can experiment.

Even though the explanations in the Programming Kit are clear, this unit is not designed for a novice computer user. It is easy enough, however, so that those who know some BASIC can use it without frustration.

Additional support is offered through the Padmasters' Guild. Membership is available without charge to owners of the Programming Kit, and at a \$9.95 fee per year to others. This entitles you to the *Chalk Board Newsletter*, which serves as a clearinghouse for users'

programs. The Guild also provides access to a hot line number for technical questions and information about new releases.

PowerPad is produced by Chalk Board, Inc., 3772 Pleasantdale Road, Atlanta, GA 30340. The PowerPad with Starter Kit has a retail price of \$149.95. LogicMaster, Bear Jam, and Leo's Links cost \$39.95 each. ■

**Janet Meizel
Davis, CA**

Apple Graphics Tablet

Electronic digitizing tablets, such as the Apple Graphics Tablet, are the electronic equivalent of graph paper. They contain a fine grid of wires. This grid is connected to the computer and is used to record the X-Y coordinate location of an electronic pointer (also connected to the computer) when it touches the surface of the tablet. Digitizers are a common part of computer aided design (CAD) systems and serve as electronic drafting tables.

Graphics tablets also serve as drawing boards for graphic designers and artists who create electronic images with their digital pens, brushes, and ink. The ease with which alternative designs may be created has given artists a new medium and new freedom with which to exercise their creative talent.

As with most computer applications, the software defines the limits of a user's capability. Digitizers are no exception, and the Apple Graphics Tablet comes complete with two types of software and the potential for you to develop a third. Software that controls the internal operation of the tablet, such as detecting the location of the pen on the tablet's surface, is provided in 2K of ROM firmware on the tablet's interface card. A second set of software, provided on a floppy disk and written in Applesoft BASIC, communicates with the firmware and provides you with a menu of 22 various functions. The menu is located along the top of the tablet as a row of 22 grid cells. A second row of 22 cells is reserved for user-defined menu functions.

**"The ease with
which alternative
designs may be
created has given
artists a new
freedom."**

You install the Graphics Tablet in your Apple by inserting an interface card connected by two wires to the tablet and the pen. The tablet is a heavy-duty 15.5-by-15.5-inch metal plate with a recessed recording area. An 11-by-11-inch plastic sheet imprinted with the menu and a grid adheres to the tablet with double-sided tape. Built-in software helps with initial alignment of the overlay.

The applications software that accompanies the tablet lets you use it for general sketching as well as measurement operations. For example, touching the pen to the menu box labeled DRAW, and then moving the pen across the tablet produces a corresponding continuous line on the Apple's display. Similarly, the LINES mode lets you define successive pairs of points which are then automatically connected by straight lines.

Drawing colors may be selected with PEN COLOR from the standard Apple set of black, white, blue, green, orange, and purple. A background color may be specified with BG COLOR.

With VIEWPORT you can define a rectangular subset of the display space which is to remain active while protecting the remainder of the display's contents from change. REDUCER causes the tablet's entire active area to be mapped onto the display's active area as defined by a viewport. As a result, large pen movements on the tablet affect small areas of the display, allowing precise placement of the pen on the display. The WINDOW command zooms in on a subset of the image and fills the display with the selected area. Unfortunately, there is no reverse zoom. After you zoom in, the image cannot be re-scaled to its former size. Images can be moved about on the display with the SLIDE command and also may be

reduced to only two colors with SEPARATE, much as would be required for creating color-separate images for use in offset printing.

Images once created can be saved as display files, loaded into memory, or listed by name within a catalog. Renaming or deleting files must be done from the operating system level.

A source code listing is provided of the Applesoft BASIC program which performs the 22 menu functions for sketching and measurement. As a result, any of the 22 functions may be modified or used as a model to create new functions. The program fills all available memory on an Apple II with 48K RAM, so adding new functions would require that you first delete the code for one or more existing menu functions. Examples of additional functions and procedures for deleting existing functions are described in the manual.

The Graphics Tablet manual provides sample BASIC programs for reading the tablet and printing the resulting coordinates to the display. With the information provided, it would be a straightforward task to modify the listings shown in order to store coordinates in memory and write them to a disk as a graphic data base for use with application-specific graphics software. The manual also includes guidelines for preparing machine language software to increase speed of operation.

The Apple Graphics Tablet is a professional graphic input device. The tablet's ROM based input/output software, when combined with disk based applications software, can provide versatile and sophisticated graphic input capabilities. The supplied applications software for sketching and measurement is not as flexible as, for example, a KoalaPad. However, the Applesoft source code is provided and is a valuable aid for the user wanting to create his or her own graphics applications in conjunction with the tablet firmware.

At \$795, the Apple Graphics Tablet is not a low cost substitute for a game input tablet but rather is a quality graphic recording device best appreciated in commercial or industrial applications. ■

**Allan H. Schmidt
Concord, MA**

CALENDAR



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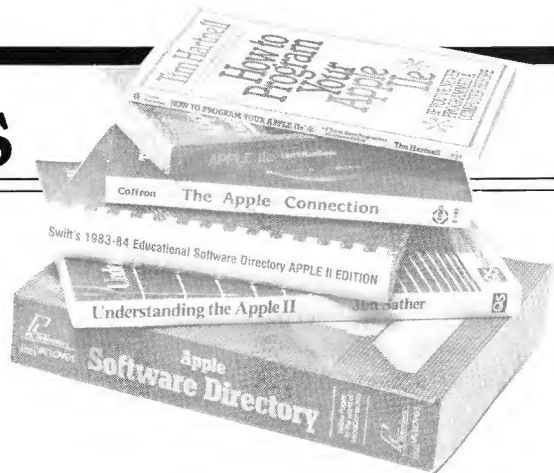
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BOOK REVIEWS



The Academic Apple

by Richard Mowe

Reston Publishing
11480 Sunset Hills Road
Reston, VA 22090

Softcover, \$10.95

The *Academic Apple* is a book for teachers, parents, and students. It is a book for beginning programmers and for advanced writers of computer software. It is a book for word processors and for those who would teach word processing. In short, it is a book for almost everyone, and thus a book for no one.

Richard Mowe has combined child development with computer literacy, computer programming and word processing, but the pieces just don't seem to fit. Mowe merely gives us watered down generalities of behavioral expectations for various age levels coupled with benign and useless computer-related activities.

The chapters on "Doing Programming" (BASIC) and "Using a Word-processor" (Applewriter II) are based on Mowe's own reproducible worksheets. These are well designed and could easily become the focal point for lessons in BASIC and Applewriter II. Unfortunately, most of these are not formatted properly for photocopying and would require some cutting and enlarging for usable student worksheets.

Although *The Academic Apple* carries a 1983 publication date, much of the discussion about hardware and word processing needs to be updated. Mowe addresses needs of Apples with 16K, 32K and even 48K, but never once mentions the Apple IIe and its 64K. He also devotes time to shift key modifica-

tions and uppercase displays that are typical of the II and the II Plus.

Mowe's word processing chapter is devoted entirely to the Applewriter II. His rationale for using this particular word processor is its popularity, simplicity, and compactness. Applewriter II is both popular and compact, but I would strongly argue Mowe's remark about simplicity. He states "the young learner's first (word processing) program should be easy to understand." I agree. But Applewriter II does not fit the bill. Mowe should update this chapter to include the newer Applewriter IIe and note some word processors better suited for elementary use (Bank Street Writer, for example).

As an educator and a parent, I was disappointed with *The Academic Apple*. Richard Mowe certainly has some good ideas, but his book is too generalized and too outdated to be of much value. ■

Bill Rowland
Glen Ellyn, IL

Better BASIC for the Apple

J.N.P. Hume and R.C. Holt

Reston Publishing
11480 Sunset Hills Road
Reston, VA 22090

Softcover, \$14.95

Is there really such a thing as better BASIC? Authors Hume and Holt believe so, and much of this book teaches you not just what BASIC commands mean, but how to use them more effectively in your programming. They emphasize structured programs, with routines that can easily be understood and

modified by people other than their authors.

Probably the best thing about this book is that it's logical. *Better BASIC* starts by telling you what programming is and how BASIC works. There's a smattering of information on how a computer operates, and a good review of what a micro can work with. It moves easily from numbers to strings to expressions. Authors Hume and Holt start with the simple things—PRINT, HOME, REMARK—and gradually lead into the more complex areas of BASIC.

There's a brief discussion of PEEK and POKE commands. Unfortunately, there's just enough information here to make someone dangerous.

Strongest but Weakest Part

Loops are covered well, and they lead to an introduction of how to branch to one area or another inside your programs. This is probably both the strongest and the weakest part of the book, as the authors spend considerable space lamenting the lack of the IF... THEN... ELSE statement that Applesoft BASIC does *not* have. Holt and Hume explain the sequence of commands to overcome this limitation, but persist in using the term IF... THEN... ELSE in their text.

There's brief coverage of flowcharting, with, for some reason, only two flowchart symbols included. The section on arrays is good and covers both single- and two-dimensional arrays. *Better BASIC* has an excellent chapter on strings that not only explains what they are, but how to link them together, split them into specific parts, and so on. It would have been helpful to have some real-world examples of how to use, for in-

stance, the LEFT\$ function to control data entry, but the information presented is generally complete. The chapter on graphics is useful, and there's good information on both sequential and random access text files.

Good Programming Tips

Toward the end of the book a good deal of text is devoted to the overall concept of good programming, explaining things like how to choose the right variable names, the proper use of subroutines, good testing procedures, and so on. I especially liked the information on sorting. (Both bubble and Shell sorts are explained.) *Better BASIC* starts with a simple sorting process that works, and then shows you how to refine it, to make it more efficient. There's even advice on scientific programs (how to solve a polynomial equation, how to compute the area under a curve) and advanced details on different data structures.

Each chapter closes with some good exercises that let you practice what you just learned. While much of this seems oriented toward examples from the world of education, it makes the entire process more effective.

Not all is perfect, of course. *Better BASIC* suffers from an unfortunate tendency to use the letter I as an index counter in its programs, but it is too easily confused with the number 1. I'd like to see programmers abandon this practice.

The authors list all program lines lower than 100 with a zero in front "... to get a better alignment of the type." However, seeing programs written like

```
010 REM PROGRAM BATCH
020 REM READS DATA
030 READ X,Y
```

is much more annoying than any misalignment might be.

The authors also like to use a lowercase b to indicate blank characters in a string, to help explain how your Apple can count (for example) the number of characters in a phrase. An example line is `HEREbISbAb CHARACTERbSTRING`; it would have been clearer to use an underline character to represent a blank,

"Each chapter closes with exercises to practice what you learned."

for this output: `HERE_IS_A_CHARACTER_STRING`.

The deficiencies, however, are minor. There's simply a lot of good information inside *Better BASIC for the Apple*, as it will not only teach you how to use the language, but how to function within the BASIC environment in a most effective manner. ■

**Greg Glau
Prescott, AZ**

Going Places with the New Apple //c

by Danny Goodman

Simon & Schuster Electronic Publishing Division/Pocket Books
1230 Avenue of the Americas
New York, NY 10020

Softcover, \$3.95

This book should be included free with every Apple //c sold. Although its four sections are well-conceived and clearly written, most of the information applies to all computer systems. Of its 240 pages of text, charts, and pictures, only 52 relate specifically to the //c. For example, the introduction explains the idea of computers as tools; differentiates between the terms mainframe, mini- and microcomputer; lists the elements of computer systems, and cites personal computer uses and misuses.

Chapter one lists the contents of the //c package (console, power transformer, RF modulator, video cable, antenna switchbox, three manuals, five software disks) and then describes specific attributes of the console, keyboard, internal disk drive, the rear panel connectors, and the other controls and lights (reset,

80/40 column, Sholes/Dvorak keyboard, volume control knob and headphone jack, Power On and Disk Use) found on the enclosure.

Chapter two covers the 65C02 microprocessor in the //c, and briefly describes the binary system, ASCII coding, RAM/ROM memory, and text and graphics modes of video display.

Chapter three discusses peripheral devices. Although the //c is mentioned frequently, the information (except for the as-yet-unavailable flat panel display, the Scribe thermal transfer printer, and the Apple-Mouse pointing device) is applicable to any computer. A superficial comparison of computer types and brands is in chapter four.

All eight chapters of Part II cover subjects (such as word-processing) common to all computer systems. In this section, Goodman introduces Appleworks, a new program from Apple, which integrates word processing with a limited spreadsheet and data base manager designed to work with the //c as well.

The five appendices cover the technical specifications of the machine, the connector-pin signals, the differences between the Apple //e and //c, an explanation of the System Utilities disk, and a list of names and addresses of companies mentioned in the text.

Throughout the book, good quality photographs and illustrations elucidate the hardware and software descriptions. I found only two errors in the text: reference to the 65C02 using complimentary rather than complementary metal-oxide semiconductor technology and describing the DIN-type serial port connectors as D-type.

Although Goodman writes well and has obviously had the wholehearted cooperation of the Apple organization, I cannot help but think of this as a well-padded, albeit well-written, pamphlet. I am left with the feeling that Apple should have bought all rights from Goodman and incorporated the pertinent sections into the brochures available at its dealers and into its //c manuals. ■

**Jay Schwarz
Port Chester, NY**

Computers in Teaching Mathematics

by P. Kelman, A. Bardige,
J. Choate, G. Hanify, J. Richards,
N. Roberts, J. Walters, and
M. Tornrose

Addison-Wesley Publishing
Company, Inc.
Reading, MA 01867
Softcover, \$14.95

Computer technology is entering the classroom and the school curriculum—some say far too rapidly, others say much too slowly. Many teachers, principals, school administrators, and parents are suspicious and fearful of impending computerization, because they do not understand the significance of computer technology and its impact on society, or computer technology in teaching.

Computers in Teaching Mathematics addresses significant issues in computers in education. Although oriented to the school mathematics curriculum, the book contains examples of computer applications in other disciplines that should interest all educators, school administrators, and parents concerned about the future use of computers in education.

The book has two stated focal points: transforming process and transforming content, which, together with the three stated themes of problem solving, computer graphics, and programming, demonstrate that computers can be used successfully in teaching mathematics.

Although this is *not* a computer programming book, computer languages and some computer programming techniques are discussed. Several computer programs are given (Applesoft BASIC or Logo) to complement the text on transforming process or content.

Each chapter presents a different aspect of using computers in mathematics education. Chapter two discusses traditional CAI and raises issues of practice and philosophy in traditional CAI methods. This establishes the point of departure for transformation in the rest of the book.

Chapter three discusses the transforming process by focusing on

problem solving. It includes examples of how programs such as VisiCalc, TK!Solver, and Geography Search can offer new kinds of problem solving activities that concentrate on the process rather than the outcome. The chapter places emphasis on exploring the context of solutions to a problem rather than striving for the one right answer.

Chapter four, on graphics, starts with Logo's usefulness in exploring concepts such as similarity and congruency, rotations and transformations, and coordinate geometry, and then progresses into BASIC, with its ability to achieve similar results from a math perspective. The seventeen exercises outlined in this chapter range from elementary Delta Drawing to function plotting and solving quintic equations.

Chapter five illustrates how the content of the mathematics curriculum alters using the computer. A quick course on computer science in chapter six shows the teacher that math is involved internally in the working of a computer. It provides the average reader with an overview of computer jargon, numbering systems, alphanumerics, logical operations, peeks, pokes, and calls.

Chapter seven explains programming and computer languages, and urges the reader to think of programming as a construction activity where creativity and problem solving play significant roles.

Outlining needs for staff development, creating and planning a computer resource center, curriculum development and planning, and making and breaking images in chapter eight provide guidance for resource persons. Finally, a reference section lists helpful resources to implement computer-oriented education.

By building a foundation for informed discussion and debate, *Computers in Teaching Mathematics* will influence future directions of our mathematics curriculum. Many educators are beginning to realize the computer is nothing more than a tool, and like any tool, it is appropriate for some applications and inappropriate for others. ■

A.E. Doughty
Edmonton, AB

Computers, Teaching, and Learning: A Guide to Using Computers in Schools

by Jerry W. Willis, D. La Mont
Johnson, and Paul N. Dixon

dilithium Press
P.O. Box 606
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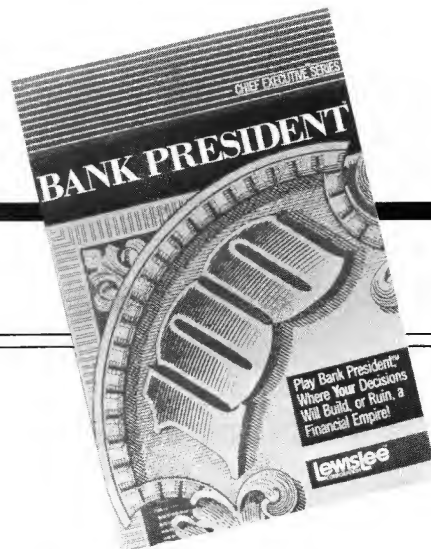
Computers, Teaching, and Learning is a guide for those educators who have little or no experience with microcomputers. In ten chapters (257 pages), the authors chart the history of computers, illustrate the computer's current applications, identify specific requirements in selecting the proper computer, analyze the programming languages of BASIC, Pilot, and Logo, discuss the values of computer-assisted instruction (CAI) and computer-managed instruction (CMI), and deal with information sources such as periodicals, publishers, and organizations.

The book gives the reader a good foundation on computers and education. The chapters are informative, especially the sections on selecting an educational computer, applying the computer to the classroom, and operating the computer-assisted and computer-managed programs. *Computers, Teaching, and Learning* also contains a valuable information section, which is an extensive listing of journals, computing periodicals, and educational software sources.

To ignore the significance and inevitability of computers in the classroom is to ignore the future. The authors stress that computers are not replacements for teachers. Computers are enhancers, augmenters of learning. The authors attempt to allay the fears that educators may have. Their book is a well-written, carefully planned guide that gives educators the ability to look upon computers as friendly, unthreatening educational tools. ■

Gerry Robinson
Windham, NH

NEW SOFTWARE



Bank President Puts You in the Money

Become CEO of a large commercial bank with Bank President, a simulation game that lets you set interest rates, control branch offices, manage portfolios, and issue stock. Full color graphs and charts keep you informed on your progress and economic conditions. With three skill levels, games last one hour or several weeks. Priced at \$74.95, it is the first in a series of business management games from Lewis Lee Corp., P.O. Box 51831, Palo Alto, CA 94303. Use Reader Service number 463.

For Collectors Only

Collectors of stamps, coins, or even baseball cards find help with Masstore programs. Menu-driven, they organize, sort, and print out valuable data concerning your collection. CoinMasstore (\$59) and StampMasstore (\$49) are for coins and stamps, respectively. Masstore Collector (\$49) lets you set categories that match your unique situation. For information, contact SoftShoe Enterprises, 10959 Kane Avenue, Whittier, CA 90604. Reader Service number is 468.

Hit the Beach!

A fast-paced strategy game set on D-Day, Beach Landing puts you in the thick of combat. Try to land safely, avoid traps and land mines, and successfully plant Old Glory. Magnified views pinpoint details of the battle with realistic graphics and animation. For \$39.95, you can join the battle along with Weekly Reader Family Software, 245 Long Hill Road, Middletown, CT 06457. Circle Reader Service number 461.

Word Processor Includes Typing Tutor

The Write Choice, a full feature word processor, works with the Apple //c to fill all your typing needs. Comprehensive documentation covers document formats, grammar, punctuation, and style. Included is Tut's Typewriter, a 24-lesson tutorial in hi-res graphics to teach

Product descriptions contained in this section are based on information supplied to us by the respective manufacturers. These announcements are provided solely as a service to our readers and do not constitute an endorsement by inCider of any given product.

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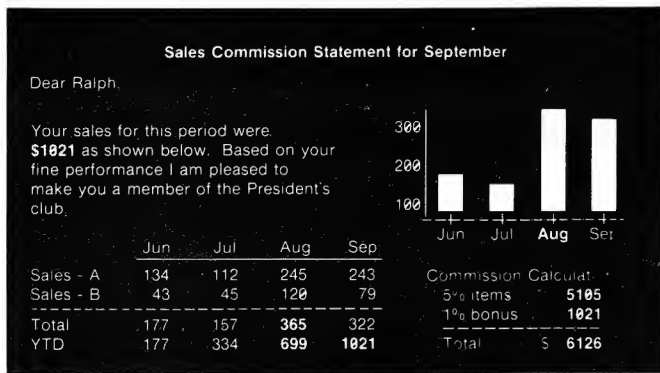


Masstore for collections of all sorts.



Beach Landing brings you to D-Day.

edited by Kerry J. Lanz



Jack2 integrates business reports.

up to 25 users the standard QWERTY keyboard or the Dvorak keyboard. The package costs \$44.95, but Tut's Typer is available separately at \$19.95. Contact Roger Wagner Publishing, Inc., 10761 Woodside Avenue, Suite E, P.O. Box 582, Santee, CA 92071. Reader Service number is 450.

Jack2 Hops Aboard the //c

Jack2 is a business report writer that combines word processing, spreadsheets, and data management on the same screen. The Apple version (\$395) will run on the //e and the //c. All screen information, including spreadsheets

and bar charts, may be printed out exactly the way it appears on the screen. Jack2 is available from Business Solutions, Inc., 60 East Main Street, Kings Park, NY 11754. Reader Service number is 490.

Mastertype Teaches Dvorak

MasterType, a best selling educational program, is now enhanced for the Apple //c. Featuring double hi-res graphics, it includes lessons on the Dvorak keyboard which is accessed by a top-mounted switch on the //c. A typist using MasterType to learn the Dvorak keyboard can achieve increased speed, comfort, and accuracy. Scarborough Systems, Inc., publishes MasterType for

\$39.95 at 25 North Broadway, Tarrytown, NY 10591. Reader Service number is 456.

Super Data Base for the //c

Superbase is a powerful data base management and information retrieval system now available for the Apple //c. Fast record access and menu-driven operation combine to suit any application. This system costs \$99 from Precision Software, Inc., Suite 1100, 820 Second Avenue, New York, NY 10017. Reader Service number is 455.

Apple //c Adds Catalyst

The popular control program, Catalyst from Quark, is now available for

Circle 162 on Reader Service card.

Bible Mountain

A fun and exciting Bible educational game!

BIBLE MOUNTAIN is better than ever! It now supports multiple choice questions, has excellent Hi-Res graphics and sound, and much more!

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the Apple //c and the Quark hard disk. Catalyst is a hard disk manager that moves programs from floppy disks to hard disk. It is priced at \$149 by Quark, Inc., 2525 West Evans, Suite 220, Denver, CO 80219. Reader Service number is 454.

Dazzle 'em with Graphics

Dazzle Draw is a complete illustration package that takes full advantage of the Apple //c. It requires 128K and double hi-res graphics. Input may come from the AppleMouse, Koala Pad, graphics tablet, or joystick. With pull-down menus and multiple windows, your //c runs like a color Macintosh. Dazzle Draw costs \$49.95 from Broderbund Soft-

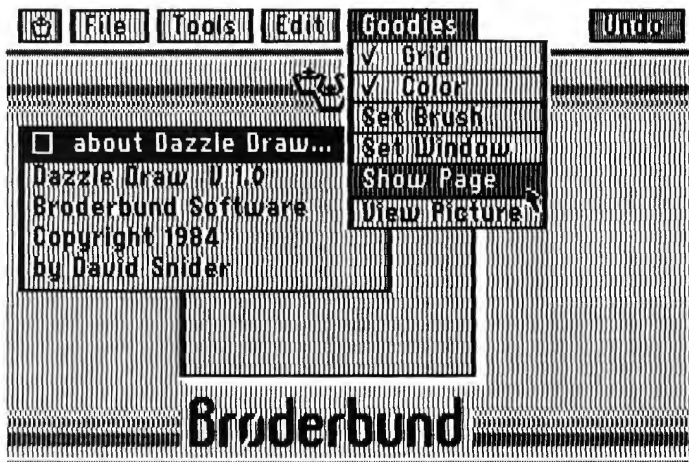
ware, 17 Paul Drive, San Rafael, CA 94903. Reader Service number is 453.

Word Challenge Boggles Your Apple

Hayden has released Word Challenge, a vocabulary game like Boggle but with 26 skill levels. Presented with a grid of letters, you make as many words as possible in a set time. No cheating; the program has a dictionary of 90,000 words. Take the Challenge for \$39.95 from Hayden Software, 600 Suffolk Street, Lowell, MA 01853. Reader Service number is 467.

Mr. Fixit Repairs Data Damage

Disks can be damaged and data lost by wear,



Dazzling //c graphics with Dazzle Draw.

scratches, and spills. Mr. Fixit restores blown disks and recovers data. Clear menus and comprehensive manual make it easy to scan a disk for damage, to copy a damaged disk, and to restore or edit data. Mr. Fixit's fee is \$49.95, payable to Omega Micro-

ware, Inc., 177 W. Hintz Road, Wheeling, IL 60090. Reader Service number is 469.

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Captain a B-17 Flying Fortress in 50 Mission

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- Very fast conversion (25 micro seconds).
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- Only elementary programming is required to use the A/D.
- The entire system is on one standard size plug in card that fits neatly inside the Apple.
- System includes sample programs on disk.

PRICE \$319

A few applications may include the monitoring of • flow • temperature • humidity • wind speed • wind direction • light intensity • pressure • RPM • soil moisture and many more.

8 BIT, 8 CHANNEL A/D

- 8 Channels
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- The analog to digital conversion takes place on a continuous, channel sequencing basis. Data is automatically transferred to on board memory at the end of each conversion. No A/D converter could be easier to use.
- Our A/D board comes standard with 0, 10V full scale inputs. These inputs can be changed by the user to 0, -10V, or -5V, +5V or other ranges as needed.
- The user connector has +12 and -12 volts on it so you can power your sensors.
- Accuracy: 0.3%
 - Input Resistance: 20K Ohms Typ

PRICE \$129.00

SIGNAL CONDITIONER

Our 8 channel signal conditioner is designed for use with both our A/D converters. This board incorporates 8 F.E.T. op-amps, which allow almost any gain or offset. For example: an input signal that varies from 2.00 to 2.15 volts or a signal that varies from 0 to 50 mV can easily be converted to 0-10V output for the A/D.

The signal conditioner's outputs are a high quality 16 pin gold I.C. socket that matches the one on the A/D's so a simple ribbon cable connects the two. The signal conditioner can be powered by your Apple or from an external supply.

FEATURES

- 4.5" square for standard card cage and 4 mounting holes for standard mounting. The signal conditioner does not plug into the Apple, it can be located up to 1/2 mile away from the A/D.
- 22 pin, 156 spacing edge card input connector (extra connectors are easily available i.e. Radio Shack).
- Large bread board area.
- Full detailed schematic included.

PRICE \$79.00

DIGITAL INPUT/OUTPUT BOARD

- Provides 8 buffered outputs to a standard 16 pin socket for standard dip ribbon cable connection.
- Power-up reset assures that all outputs are off when your Apple is turned on.
- Features 8 inputs that can be driven from TTL logic or any 5 volt source.
- Your inputs can be anything from high speed logic to simple switches.
- Very simple to program, just PEEK at the data.
- Now, on one card, you can have 8 digital outputs and 8 digital inputs each with its own connector. The super input/output board is your best choice for any control application.

The SUPER INPUT/OUTPUT board manual includes many programs for inputs and outputs. A detailed schematic is included.

Some applications include:

Burglar alarm, direction sensing, use with relays to turn on lights, sound buzzers, start motors, control tape recorders and printers, use with digital joystick.

PRICE \$69.00

Please see our other full page ad in this magazine for information on Applied Engineering's Timemaster Clock Card and other products for the Apple. Our boards are far superior to most of the consumer electronics made today. All I.C.'s are in high quality sockets with mil-spec. components used throughout. P.C. boards are glass-epoxy with gold contacts. Made in America to be the best in the world. All products compatible with Apple II and //e.

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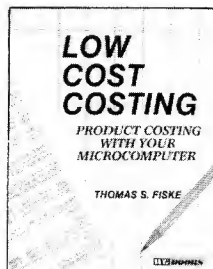
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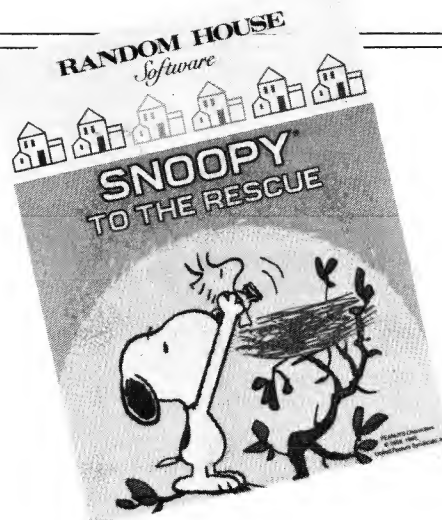
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Peanuts and Apples do mix.

Crush, a new role-playing game featuring 50 harrowing raids over France and Germany in World War II. Start by picking a crew and determining bomb/fuel ratio. Survive the raid and you are awarded points and promotions. 50 Mission Crush costs \$39.95 from Strategic Simulations, Inc., 883 Stierlin Road, Building A-200, Mountain View, CA 94043. Mark Reader Service number 465.

years old. They include Charlie Brown's ABC's, Peanuts Maze Marathon, Snoopy's Reading Machine, and Peanuts Picture Puzzlers. Each double-sided disk costs \$39.95. Information is from Random House, 201 East 50th Street, New York, NY 10022. Reader Service number is 491.

Wizardry Meets the Mouse

Sir-Tech Software has introduced new versions of the three Wizardry scenarios to use with the Apple IIc and the mouse. These enhanced versions work with the entire Apple II family, but will automatically seek out and use the IIc's 128K memory for faster operation. You can use a mouse to move through the maze. The Wizardry scenarios are produced by Sir-Tech Software, Inc., 6 Main Street, Ogdensburg, NY 13669. Use Reader Service number 451.

Peanuts on Apples

Random House enters the Apple market with six Peanuts programs for children pre-school to 12



El-Ixir, a two-player strategy game.

Strategy with El-Ixir

El-Ixir is a two player board game similar to Go. The object is to gain territory by landing on or surrounding squares of a grid. Squares are yours when joined to one of the four corners of the board. All commands are one key or push button entry; color and music are used throughout. Priced at \$29.95, El-Ixir comes from Isoft, P.O. Box 10762,

NEW SOFTWARE

Stanford, CA 94305.
Reader Service number
is 466.

Off to Grandma's House

Using a mouse or joystick, young children can decorate Grandma's House with treasures from around the world. Children learn to design by moving quickly from one fanciful location to another and by picking up new decorations for the stately Victorian manor. The visit will cost \$34.95 courtesy of Spinnaker Software, 215 First Street, Cambridge, MA 02142. Mark Reader Service number 457.



Decorating Grandma's House with a joystick.

Financial Cookbook for Home Economics

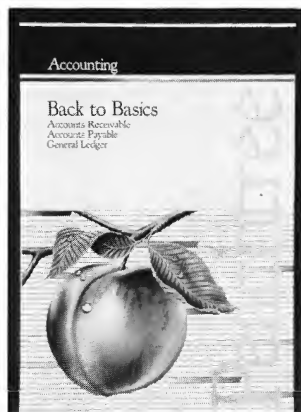
One of the 21 products featured by Apple for the //c is Financial Cookbook. It works on the Apple II family and supports the AppleMouse. Cook up 32 recipes—financial formulae—to compute interest rates, savings, tax shelters, and mortgages. The manual includes a complete index and financial glossary. The Cookbook is \$50 from the chefs at Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403. Circle Reader Service number 452.

Communications from The Source

Apple Sourcelink is communications software from The Source for use with the company. It is compatible with the new Apple Modem, and with Hayes and SSM modems. Sourcelink includes automatic dial and sign-on for The Source and other major databanks, one key access to The Source services, data capture and editing, and simplified data transfer. Price is \$49.95 from The Source, 1616 Anderson Road, McLean, VA 22102. Reader Service number is 462.

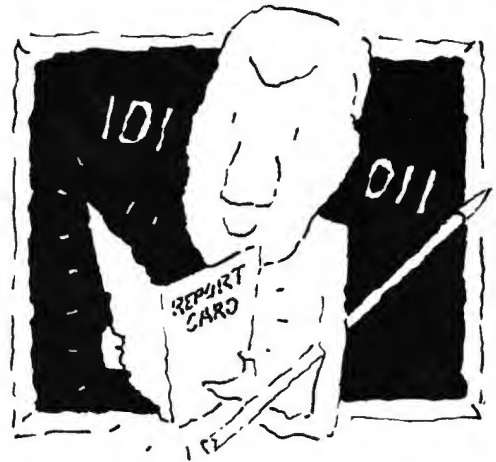
Back to Basics Accounting System

For small offices and beginning businesses, Back to Basics offers instruction as well as computerized accounting. Instruction covers computers and accounting principles. The accounting system includes: General Ledger, Accounts Receivable, and Accounts Payable. Each module is \$95, or all three for \$195, from Peachtree Software, 3445 Peachtree Road N.E., Atlanta, GA 30326. Use Reader Service number 458.



Back to Basics fills accounting needs.

Circle 118 on Reader Service card.



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Users and experts alike are giving The Visible Computer straight A's for making machine language understandable.

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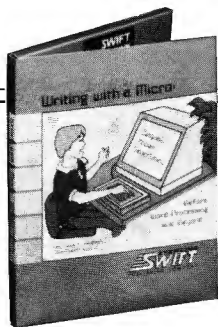
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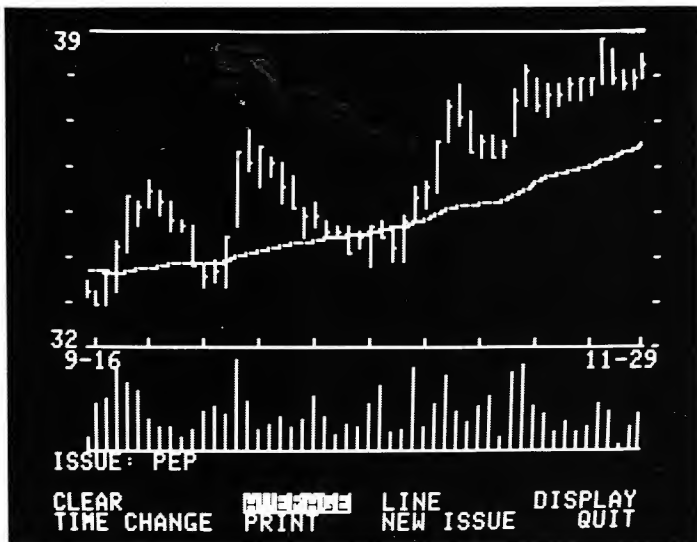
Word processing becomes style processing in Writing with a Micro. This program, suitable for home or classroom use, is used like a word processor but also teaches creative writing skills, rhyming patterns, figures of speech, and sentence formations. Requiring an 80-column card, Writing with a Micro costs \$59.95 from Sterling Swift Publishing Co., 7901 South IH-35, Austin, TX 78744. Reader Service number is 464.

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Dow Jones & Company presents the Investor's Workshop, a home portfolio management program chosen by Apple as a featured product for the //c. The Workshop helps you monitor stocks and bonds, generate reports, and perform technical analysis. Data is collected by modem from Dow Jones News/Retrieval. Make an investment of \$149 with Dow Jones & Company, Inc., P.O. Box 300, Princeton, NJ 08540. Reader Service number is 460.

Painless Business Letters

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Portfolio management with Investor's Workshop.

of letters ready for use with your word processor. Included on the disks are letters for sales, acknowledgements, complaints, thank you notes, and collections. Letters are cus-

tomized to meet your needs. The Apple version is \$99.95, by Delta Point Corporation, 711 West 17th Street, B-10, Costa Mesa, CA 92627. Reader Service number is 459.

Circle 332 on Reader Service card.

PROGRAMMERS: New DAVID-DOS II™

HIGH-SPEED DOS 3.3 DOS-MOVER/FAST-GARBAGE

Makes high-speed disk access under all conditions. DOS-mover frees 10,000 bytes of extra memory for programs. FRE command does ultra-fast garbage collection. Clock or manual disk dating. May be licensed.

100 Sectors in 7 Seconds

Speed Load/Save Applesoft, Binary & Integer 100 sector programs in 7 seconds. Tload/Tsave Random & Sequential Text Files at same speed. Speeds up programs like Home Accountant.

10K More Memory

Use HIDOS command in hello program for turnkey startup, adding 10K free memory to run 30% larger Applesoft programs than ProDOS. Moves DAVID-DOS II and 4 buffers above main memory.

Ultra-Fast Garbage

New FRE command collects a memory full of 6000 strings that are half garbage in two seconds. DOS 3.3 takes 12 minutes. FRE is so fast it is not noticeable during run of most programs.

Clock Dating

Automatic date stamping of disk files is set up for 6 kinds of clocks or Hello manual date entry. New DATE command will auto-insert date in correspondence.

All times in seconds (Time Test programs available)		DAVID DOS-II	ProDOS	DOS 3.3
TEXTFILES (100 Sectors)	TSAVE	8.0	NO	NO
	TLOAD	6.2	NO	NO
(791 Strings, 32 chars ea)	WRITE	29.3	28.0	88.4
	READ	24.3	16.3	83.8
(442 Sectors, 7 x 500)	PRINT/READ	44.2	45.9	117.1
	APPEND	142.3	142.9	1231.2
APPLESOFT (100 Sectors)	*SAVE	6.4	16.4	33.1
	LOAD	5.0	4.0	23.5
INTEGER (100 Sectors)	*SAVE	6.6	NO	33.4
	LOAD	4.9	NO	23.4
BINARY (100 Sectors)	*BSAVE	7.3	18.4	28.7
	BLOAD	5.8	4.8	24.5
48K PROGRAM SPACE (With 3 Bufs avail)	APPLESOFT	36.352	NO	36.352
	INTEGER	36.352	NO	36.352
	BINARY	36.352	34.816	36.352
64K PROGRAM SPACE (With 4 Bufs avail)	APPLESOFT	46.592	32.256	35.756
	INTEGER	46.592	NO	35.756
	BINARY	46.592	41.728	35.756

*Add 5 seconds for Verify. Apple II, Applesoft & ProDOS are trademarks of Apple

Ten New DOS Commands

1. HIDOS moves DOS above 48K memory.
2. FRE makes ultra-fast garbage collection.
3. DATE stamp files. Clock or manual dating.
4. TLOAD speed loads all Text Files to mem.
5. TSAVE speed saves Text Files from memory.
6. TLIST lists all Text Files to screen/printer.
7. DUMP Binary/Ascii to screen or printer.
8. DISA disassembles Binary to screen/printer.
9. AL prints program Address & Length.
10. / is a one keystroke Catalog.

DAVID DATA

Identical Operation

All new commands operate identical to old DOS commands on the keyboard & in programs.

Install in Three Seconds

Install DAVID-DOS II on your full disks in three seconds without touching the programs. Create bootable high-speed new disks with a Basic, Binary, or Exec Hello & 35/40 tracks. Create Data-Disks with 30 extra sectors.

Variable Speed Scrolling

Key operated variable speed scrolling for TLIST, DUMP and DISA. Lower-case accepted on all commands. Catalog shows Free-Space. Automatic support of Integer or Applesoft Card in any slot, while in HIDOS or LODOS. Vendor license includes protection system.

Compatible

All DOS entry addresses have been preserved. DOS is same length and compatible with most software. David-Dos is fully copyable. Init areas were used for David-Dos. Works with all Apple IIs including Iie, Iic, Franklin & Basis with 48K/64K/128K & Corvus & Xebec Hard Disks. Complete documentation and many utilities are on the disk.

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NEW PRODUCTS



Alien's New Speech Synthesizers

Three new synthesizers, based on the SSI 263 chip, are available from The Alien Group. All models feature unlimited vocabulary, inflection, and male or female voice with adjustable volume and speed. Voice Box 3m (\$129) and Voice Box 3i (\$219) plug into any Apple slot and feature a hi-res face that speaks the words. The third model, Voice Box 3s at \$269, connects to any computer through an RS-232C interface and comes with its own speaker. These are from The Alien Group, 27 West 23rd Street, New York, NY 10010. Reader Service number is 479.

Cable Swapping Made Easy

The Regency VDS 5000 electronically switches between four inputs, such as antenna, cable, video recorder, and home computer. Two devices (TV's and VCR for example) can simultaneously receive output from the switcher. The switcher costs \$119.95, and comes from Regency Electronics, Inc., 7707 Records Street, Indianapolis, IN 46226. Reader Service number is 489.

Epson Color Printer

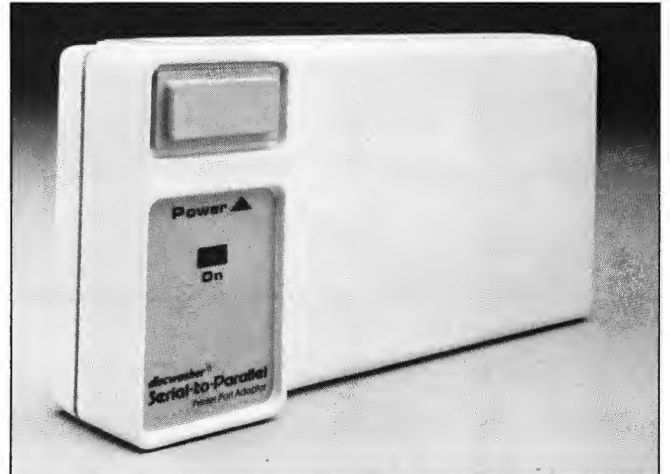
Epson enters the field of color printing with the JX-80, a 160 cps dot matrix printer that offers seven colors produced by a four-color ribbon. This new Epson has pica and elite spacing and the option of downloading special fonts. The retail price is \$800. For details, contact Epson America, Inc., Kashiwa Street, Torrance, CA 90505. Reader Service number is 481.

Parallel Adapter for Your //c

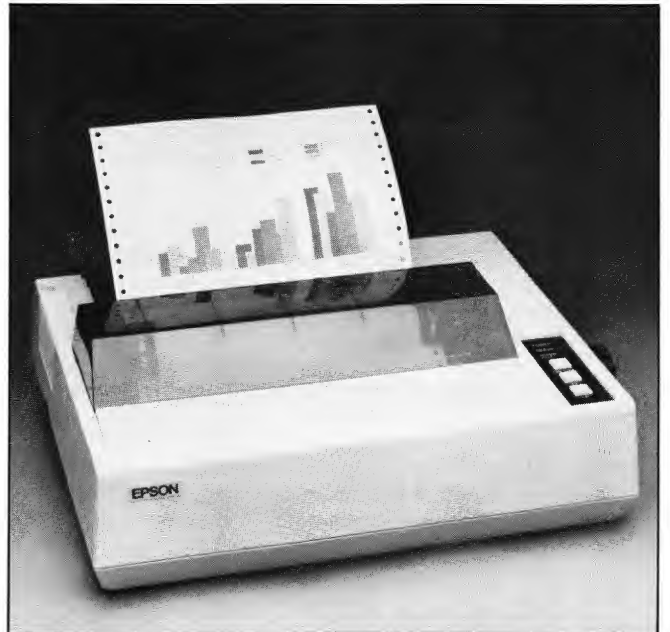
Your parallel printer easily hooks up to the //c serial port with the Serial-to-Parallel Printer Port Adapter from Discwasher. Installation is convenient and easy; once connected, there is nothing to modify. Write for information to Discwasher, 1407 North Providence Road, P.O. Box 6021, Columbia, MO 65205. Use Reader Service number 474.

Product descriptions contained in this section are based on information supplied to us by the respective manufacturers. These announcements are provided solely as a service to our readers and do not constitute an endorsement by inCider of any given product.

No more tangles with the Regency VDS 5000.



Parallel port for the serial //c.



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edited by Kerry J. Lanz

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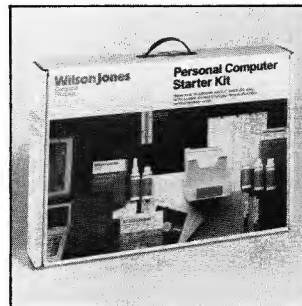


Apple //c sings with Mockingboard.

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sheet workpad, printer paper, disks and holder, and programming aids. The kit is priced at \$79.95 by Wilson Jones, 6150 Touhy Avenue, Chicago, IL 60648. Use number 483 on the Reader Service card.

Hard Disk for Apple //c

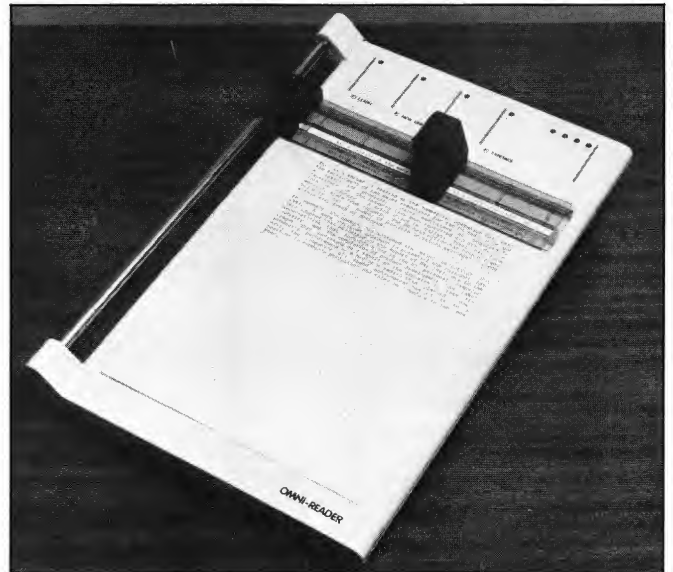
The first mass storage system for the //c is the QC10 hard disk from Quark. Offering ten megabytes, the QC10 is three to five times faster than a standard floppy disk. It plugs directly into the //c drive port, and is compatible with the rest of the Apple II family. This hard disk costs under \$2500 from Quark, Inc., 2525 West Evans, Suite 220, Denver, CO 80219. Reader Service number is 470.

Text Reader for the Apple

Omni-Reader is a handheld, optical character reader joined to your Apple by RS-232 interface. Taking just a few seconds to read a typed line, it handles the four most common fonts and can learn special ones. It is priced at \$500 by Oberon International, 5525 MacArthur Blvd., Suite 630, Irving, TX 75062. Reader Service number is 492.

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Microcom's Era 2 system is a 1200 baud, full-feature modem with menu-driven communications software. It features the Microcom Networking Protocol, a machine-independent, error correcting



Omni-Reader teaches Apples to read.

protocol that detects and corrects transmission errors between Era 2 modems. The system has a retail price of \$429. Con-

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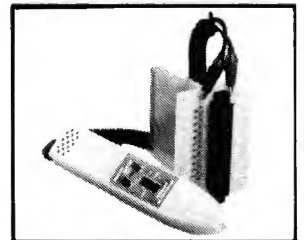
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Monitor Interface Brightens the //c

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Letter-Quality Compact Printer

Smaller than a three-ring binder and only two inches thick, the Dataport letter-quality printer is packed with features. Priced at \$295, this micro-sized, 96-character printer boasts a speed of 15 cps and uses standard typewriter paper. It prints



Make slides and prints with Screenshooter

80 columns using an Elite type wheel and is Centronics compatible. For more information write Dataport, 5525 Olinda Road, Building A, El Sobrante, CA 94803. Circle 476 on Reader Service card.

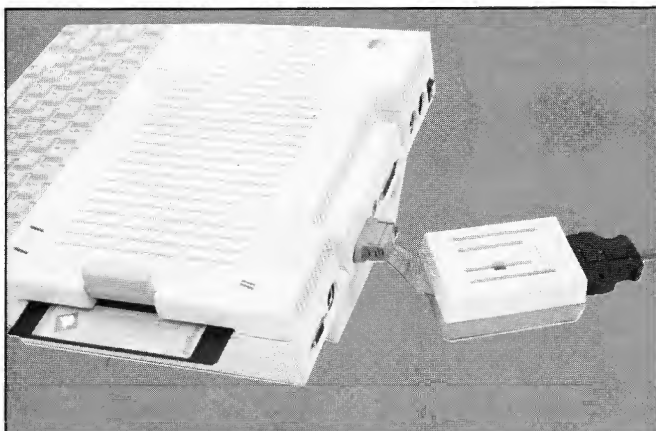
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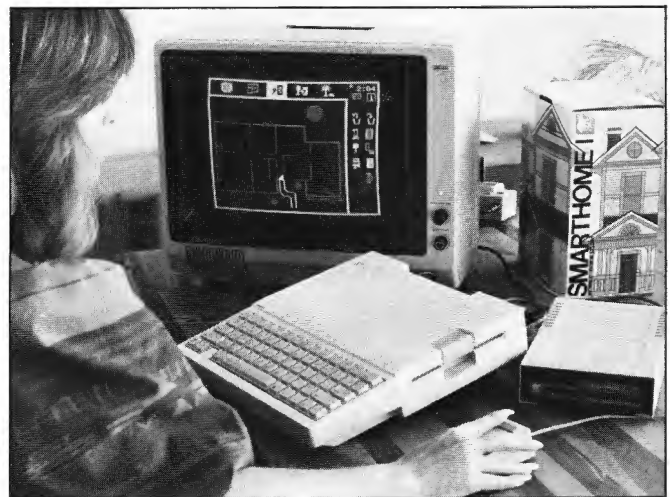
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Apple //c Supervises Your Home

Smarthome is a hardware and software package that lets your //c automate your home. It controls lights, appliances, and a security system. Programming, done through a mouse and icon-based menu, is as enjoyable as playing a video game. The unit plugs into the //c serial port. A starter package is available for \$499 from CyberLynx, 4828 Sterling Drive, Boulder, CO 80301. Use Reader Service number 475.



RGB interface for the Apple //c.



The //c mouse controls your home.

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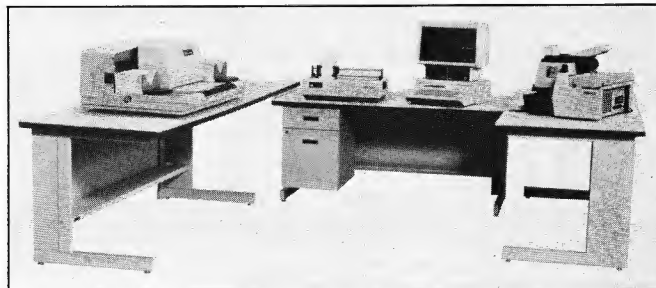
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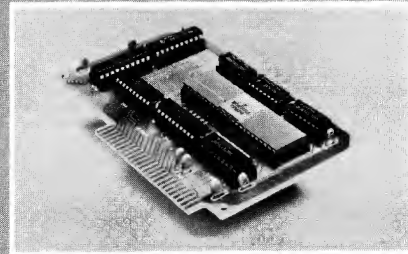
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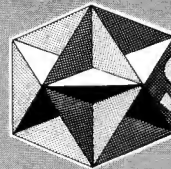
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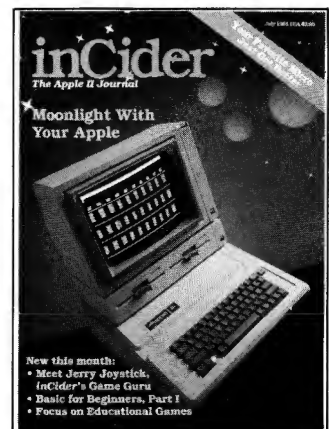
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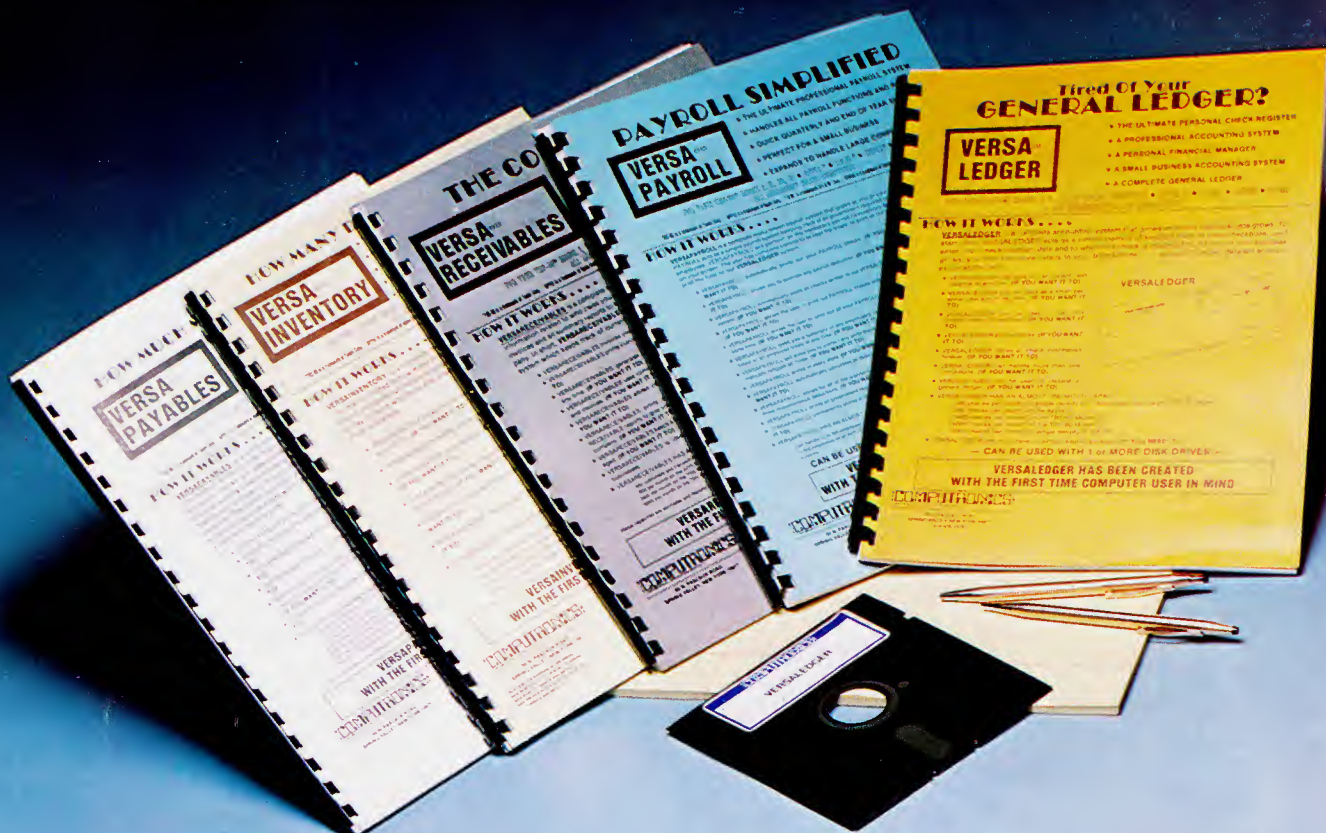
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VERSARECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement-generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSARECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSALEDGER II™ and VERSAINVENTORY™.

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VERSAINVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSAINVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below a preset reorder point, and allows you to enter and print invoices directly or to link with the VERSARECEIVABLES™ system. VERSAINVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

VERSALEDGER II™

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VERSALEDGER II™ is a complete accounting system that grows as your business grows. VERSALEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system **without any additional software.**

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- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSALEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSALEDGER II™ manual will help you become quickly familiar with VERSALEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

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